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SCORPION FAUNA OF BAJA CALIFORNIA, MEXICO: ELEVEN NEW SPECIES OF *VEJOVIS* (SCORPIONIDA: VEJOVIDAE)

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ABSTRACT: Eleven new species of scorpions of the genus *Vejovis* were collected on the Baja California Peninsula and are here described. None of these species are known to occur outside the Baja California Peninsula but several have close relatives in California, Arizona and mainland Mexico.

INTRODUCTION

The purpose of this paper is to describe and name 11 new species of scorpions belonging to the genus *Vejovis,* all from the Baja California Peninsula of western Mexico. The descriptions of these species are based on several thousand specimens collected during the summer of 1968. A number of other undescribed species of *Vejovis* were also collected on this trip but will not be discussed until further study can be made.

In June of 1968, the collecting trip departed for the Baja California Peninsula for two months of intensive field study. Two separate parties made up the cooperative expedition. One party was composed of Mont A. Cazier of Arizona State University assisted by three graduate students, Joe Bigelow, Jerry Davidson, and Norman Leppla. The other party was composed of myself and two graduate students, Michael Bentzien and William Fox. The Cazier party was primarily concerned with study of the insect fauna, especially flies of the Family Apioceridae, while my party was primarily concerned with the

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study of arachnids, especially scorpions. The two parties worked together very closely and cooperated to insure greatest success for all interests. During the months of June and July the entire length of the Baja California Peninsula was traversed overland and collections were made in as many different habitat types as was possible in the limited time. Special efforts were made to visit type localities to secure series of topotypes.

Most of the scorpion specimens were collected by means of the ultraviolet detection method (Williams, 1968a; Hadley and Williams, 1968). Rock rolling and turning other surface cover were surprisingly unproductive except for a few species. This was perhaps due to the hot dry conditions existing during the summer. The scorpions were killed and fixed each morning, using the process and fixative described by Williams (1968b).

Measurements given in this paper are the standard ones used in scorpion taxonomy, with a few useful modifications as described by Williams (1968c).

Acknowledgments

Sincere thanks and appreciation to Mont A. Cazier for his help and suggestions in the field. Thanks also to Michael Bentzien and Joe Bigelow for their many efforts and long hours of work throughout the entire expedition, and to William Fox, Jerry Davidson, and Norman Leppla for their assistance during the earlier part of the summer. Thanks are due to Charlene F. Williams for clerical assistance and to Vincent F. Lee for his technical assistance in the laboratory. Thanks and appreciation are also due Richard and Mary Lou Adcock, of the La Paz Skin Diving Service, for providing transportation to Isla Partida and Isla Espiritu Santo on their boat *Marisla,* and for their invaluable aid in pointing out habitats of special interest.

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The Baja California Peninsula

Baja California, Mexico, is an 800-mile long peninsula surrounded by the Pacific Ocean on the west and separated from the Mexican mainland by the Gulf of California. The whole peninsula of Baja California is a primitive region. There are few roads, except in border areas and in the extreme south. The peninsula is divided into two political units, the state of Baja California in the north and the Federal Territory referred to as "Baja California Sur" in the south. Baja California varies from tropical habitats in the south to harsh Colorado desert in the northeast, and chaparral forest in the northwest. Many other diverse habitats include isolated canyons, high mountains (covered with coniferous forest), volcanic ranges, sedimentary basins, foggy deserts, and shifting sand dunes.

NEW SPECIES

Vejovis grandis Williams, new species.

(Figures 1, 2.)

DIAGNOSIS. One of the largest species of *Vejovis* known both in body length and body mass. Denticles on the inferior border of the cheliceral finger reveal that this species is a member of the subgenus *Paruroctonus.* Readily identified by the numerous stout reddish bristles on the inferior intercarinal spaces of the metasoma and more or less dark markings on the carapace and mesosomal dorsum. Pectine teeth of females varies from 22 to 26, those of males 30 to 35.

Very closely related to *Vejovis vachoni* (Stahnke) and *Vejovis mesaensis* (Stahnke). Differs from *V. mesaensis* by the presence of dark dorsal markings, presence of red pedipalp fingers, and slightly more swollen pedipalp palms. Differs from *V. vachoni* in the following ways: telson more elongate and less swollen, vesicle with hairs longer and less bristle like in males; pedipalp chela without the deep, conspicuous, double dentate proximal scallop.

DESCRIPTION OF HOLOTYPE (male). *Coloration*: Base color of carapace, mesosoma, metasoma, pedipalps, and walking legs uniform bright yellow; carapace with underlying, intricate, dark color pattern, dark pigment most concentrated lateral to ocular tubercule; interocular triangle without dark markings; mesosomal tergites also with intricate dark markings, posterior tergites with dark markings more faded and not as extensive; pedipalp fingers reddish brown; eyes black; cheliceral fingers reddish brown; aculeus dark reddish brown; pectines white; tips of pretarsal claws light brown.

Carapace: Anterior margin essentially straight, but with a very subtle suggestion of a median emargination, this margin with three pairs of erect reddish bristles. Lateral eyes three per group, anterior two eyes about equal in size, posterior eye smallest of three. Median diad distinctly greater than ¼ carapace width at that point; one pair of short red bristles on ocular tubercule above and between eyes. Carapace surface densely covered by large granules.

Mesosoma: Tergites not densely granular, granules present but mostly restricted to posterior ⅓ of each tergite; tergite 7 with two pairs of irregularly dentate lateral keels and a single broad, low median keel, this set with a few isolated granules. Sterna agranular except on last sternite; last sternite with one pair of dentate keels, median intercarinal space densely granular, lateral areas with a few distinct granules. Stigma short slits. All sternites with an abundance of conspicuous reddish bristles.

Metasoma: All dorsal and dorsolateral keels serrate to deeply crenulate except that dorsal keels of segment V absent, dorsolateral keels I to IV each begin anteriorly as a distinctly broadened wing; lateral keels dentate on posterior ⅚ of segment I, crenulate on posterior ⅕ of II and ⅙ of III, absent on

IV, crenulate on anterior half of V; inferior lateral keels irregularly serrate to deeply crenulate; inferior median keels irregularly crenulate on segments I to III, irregularly crenulate to serrate on IV, irregularly serrate on V. Inferior intercarinal space of V basically smooth but with several distinct scattered granules. Space between inferior lateral keels on segments I to IV densely covered with stout reddish bristles, these very conspicuous.

Telson: Ventral aspect of vesicle smooth and agranular; this surface with about 10 pairs of conspicuous stout reddish hairs. Very subtle, broad subaculear tubercule. Vesicle slightly wider than widest dimension of metasomal segment V.

Pectines: Very elongate and curved; 31/33 pectinal teeth; triangular fulcra; ventral surface conspicuously hirsute, hairs reddish and most abundant on fulcra, middle lamellae, and anterior margin.

Genital operculum: Completely divided longitudinally; large genital papillae visible externally; surface of operculum conspicuously hirsute with about 10 pair of stout reddish bristles.

Chelicerae: Inferior border of movable finger with three small unpigmented denticles; terminal tooth of superior border subequal to terminal tooth of inferior border, but terminal tooth reduced in size. Inferior border of fixed finger with two small unpigmented denticles.

Pedipalps: Hand long and swollen, all keels distinct and granular; intercarinal spaces smooth and agranular; movable finger approximates carapace in length but fixed finger distinctly shorter than carapace; grasping edges of both fingers distinctly scalloped; teeth do not quite extend to proximal bases of each finger; teeth do not touch when chela closed over much of proximal region but no large open spaces occur.

Standard measurements and photographs: Table 1 and figures 1 and 2.

DESCRIPTION OF ALLOTYPE (female). Essentially the same as holotype in color and morphology with the following exceptions: Distinctly greater in total body length and most other body dimensions; dark color pattern on carapace and mesosoma similar in pattern, but much lighter; aculeus proportionally longer; pectines slightly shorter, with about ⅓ fewer teeth (22/22 instead of 31/33), pectinal teeth each much shorter; no genital papillae; genital operculum not completely divided longitudinally; teeth on inferior border of movable cheliceral finger larger and more distinct; inferior border of fixed cheliceral finger with three small denticles; inferior keels of metasoma slightly less prominent and not quite as distinctly crenulate or serrate; chela not distinctly scalloped.

Standard measurements: Table 1.

VARIATION WITHIN PARATYPES. Study of 273 paratopotypes (122 males, 151 females) indicated little variation from the structure of the holotype and

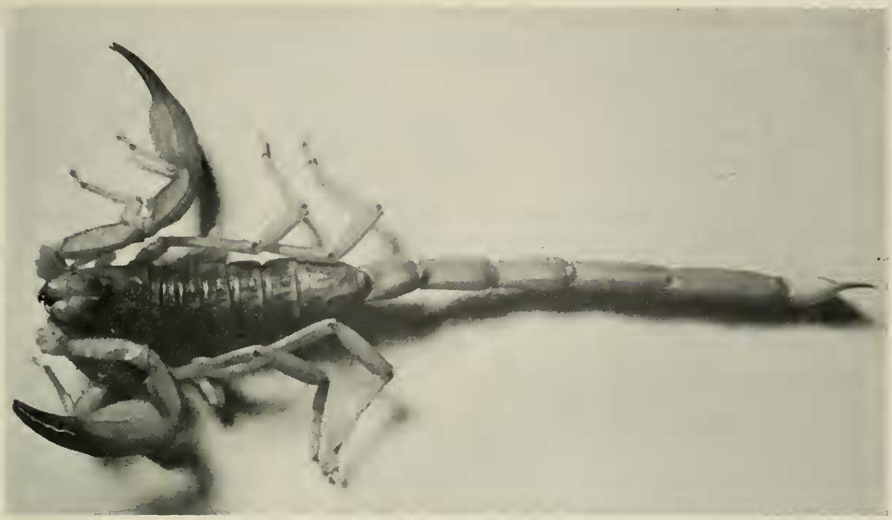

Figure 1. *Vejovis grandis,* new species. Dorsal view of holotype.

allotype. Males varied in total length from 28 to 77 millimeters while females varied from 21 to 77 millimeters. Pectinal tooth count varied from 22 to 26 (predominantly 24) in females and from 30 to 35 (predominantly 32) in males. Base cuticle color similar in most specimens, but a large degree of variability existed in the dark underlying markings. Some individuals had very dark

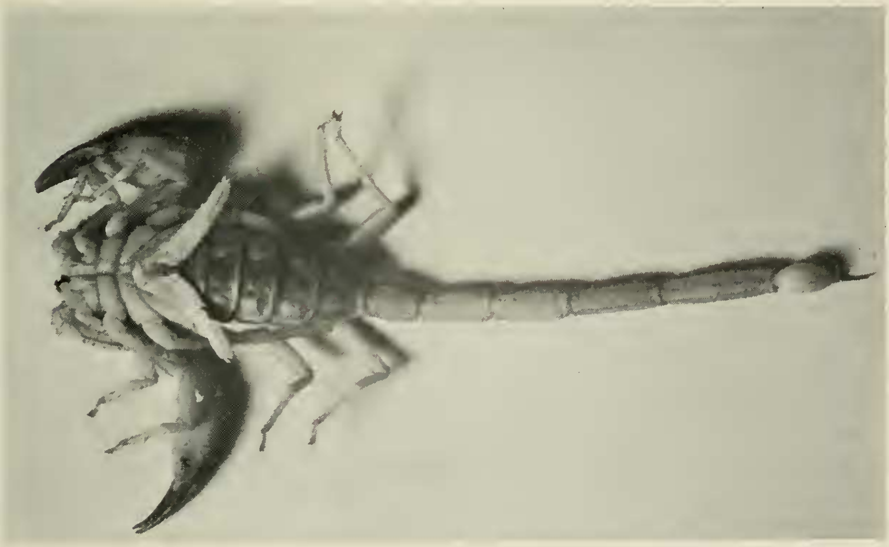

Figure 2. *Vejovis grandis,* new species. Ventral view of holotype.

TABLE 1. *Measurements (in millimeters) of* Vejovis grandis, *new species, holotype and allotype.*

	Holotype (male)	Allotype (female)
Total length	64.9	76.0
Carapace, length	7.3	9.5
width (at median eyes)	6.2	7.7
Mesosoma, length	16.3	20.1
Metasoma, length	33.5	37.1
segment I (length/width)	4.5/3.2	5.0/3.9
segment II (length/width)	5.8/2.8	6.3/3.3
segment III (length/width)	6.1/2.7	6.7/3.2
segment IV (length/width)	7.6/2.4	8.3/2.9
segment V (length/width)	9.5/2.4	10.8/2.9
Telson, length	7.8	9.3
Vesicle (length/width)	4.9/2.5	5.7/3.1
depth	2.2	2.7
Aculeus, length	2.9	3.6
Pedipalp		
Humerus (length/width)	7.2/2.2	8.3/2.8
Brachium (length/width)	6.8/2.7	7.8/3.4
Chela (length/width)	13.0/3.4	16.2/4.2
depth	4.5	5.4
movable finger, length	7.4	9.3
fixed finger, length	5.6	7.3
Pectines		
teeth (left/right)	33/31	22/22

markings on the carapace and mesosoma dorsum while other individuals had faint markings, most individuals being intermediate. Smaller individuals with dark markings more distinct, larger individuals showing tendency toward fading of dark markings. Interocular triangle always lacking dark markings. On individuals with dark pigment obsolete on the carapace a dusky ocular crescent remains.

TYPE DATA AND ETYMOLOGY. The holotype, allotype, and 273 paratopotypes were collected at Oakies Landing, 27 miles south of Puertecitos, Baja California Norte, Mexico, 12 June 1968 by S. C. Williams, M. A. Cazier, and party. The holotype and allotype are permanently deposited in the California Academy of Sciences.

This species is named "*grandis*" because of its very long and heavy body.

MATERIAL. In addition to the holotype, allotype, and 273 paratopotypes, 1622 additional paratypes were studied. These were from the following 12 locations in Baja California Norte, Mexico: Puertecitos and for 2 miles south, 10 June 1968 (S. C. Williams, M. A. Cazier, and party), 14 males, 14 females; Puertecitos, elevation 50 feet, 11 June 1968 (S. C. Williams, M. A. Cazier, and party), 5 males, 1 female; Puertecitos and for ½ mile north, 11 June 1968 (S. C. Williams, M. A. Cazier, and party), 6 males, 10 females; 8 miles north of Gonzaga Bay, 13 June 1968 (S. C. Williams), 28 males, 45 females; 6 miles north of Gonzaga Bay, 13 June 1968 (S. C. Williams), 71 males, 75 females; 10 miles north of Gonzaga Bay, 13 June 1968 (S. C. Williams), 55 males, 83 females; 1 mile north of Gonzaga Bay, elevation 100 feet, 14 June 1968 (S. C. Williams), 48 males, 49 females; 5 miles north of Gonzaga Bay, elevation 150 feet, 14 June 1968 (S. C. Williams), 27 males, 26 females; 6 miles north of Gonzaga Bay, elevation 100 feet, 14 June 1968 (S. C. Williams), 35 males, 49 females; 7 miles north of Gonzaga Bay, 14 June 1968 (S. C. Williams), 81 males, 90 females; Calamajue Arroya, elevation 1000 feet, 15 June 1968 (S. C. Williams, M. A. Cazier, and party), 64 males, 40 females; Calamajue Arroya, elevation 1000 feet, 16 June 1968 (S. C. Williams, M. A. Cazier, and party), 65 males, 59 females; Bahía de Los Angeles, elevation 25 feet, 17 June 1968 (S. C. Williams, M. A. Cazier, and party), 39 males, 30 females; Bahía de Los Angeles, elevation 25 feet, 18 June 1968 (S. C. Williams, M. A. Cazier, and party), 16 males, 15 females; Bahía de Los Angeles, elevation 25 feet, 19 June 1968 (S. C. Williams, M. A. Cazier, and party), 219 males, 263 females.

Comment. This species was found along the eastern side of the peninsula between Puertecitos and Bahía de Los Angeles where it appeared to prefer rocky volcanic habitats where considerable soil had accumulated (fig. 3). This is apparently a burrowing species, and was not found under rocks during the day. All specimens were collected by ultraviolet detection. This species was the numerically predominant species in most of the samples taken in its habitats. The samples contained a great variety of different age groups with the exception that the youngest instars were not frequently encountered. This species forms local color races throughout its distribution, being dark on dark soils and light on light soils. On light soils, the only dark pigmentation was inconspicuous, faint dusky markings underlying the translucent cuticle. The adults of even the lightest races retained the reddish pedipalp fingers, however. Its nocturnal activity patterns were very similar to those of *Vejovis mesaensis* and *Vejovis vachoni.*

Vejovis harbisoni Williams, new species.

(Figure 4, 5.)

Diagnosis. Large species of *Vejovis* in the "*wupatkiensis*" group. Adults with body color dark brown, sometimes becoming darker at the distal end of the metasoma; juveniles with more dirty yellow coloration, this with underlying dusky pigmentation. Metasoma with inferior lateral keels crenulate; inferior median keels smooth to obsolescent on segments I to III, better developed and

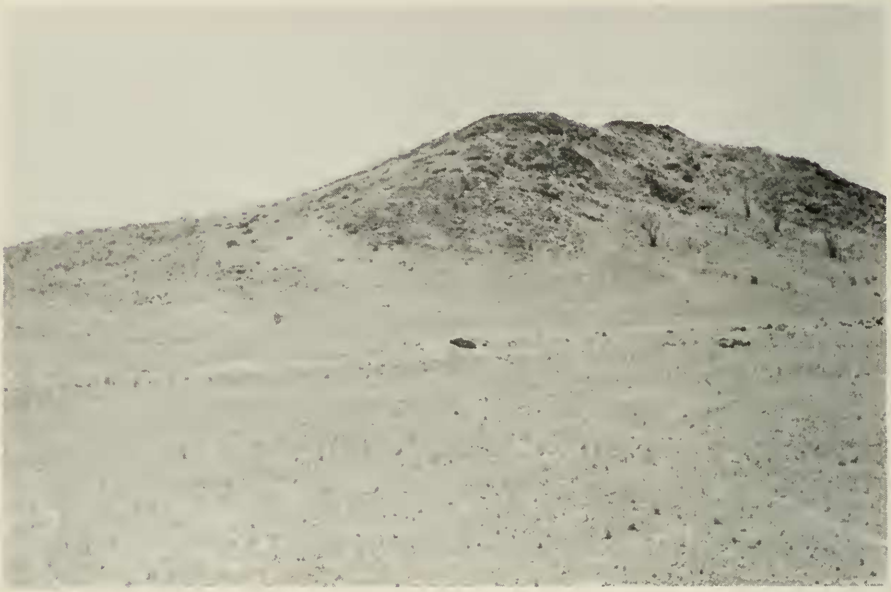

FIGURE 3. Type locality and habitat of *Vejovis grandis,* on plateau above Oakies Landing, Baja California Norte, Mexico, 13 June 1968.

smooth to crenulate on segments IV and V. Telson with swollen vesicle and with subaculear tubercule. Chelicerae with denticles completely lacking on inferior border of movable finger. Pedipalps with very elongate fingers, fixed and movable finger each longer than carapace, each finger terminates in long conspicuous tooth, these overlap when chela closed. Pectines with 21 to 23 teeth in females and 25 to 27 teeth in males.

Related to *Vejovis wupatkiensis* Stahnke from which it can be distinguished by larger adult body size, darker adult coloration, and greater number of pectinal teeth (*V. wupatkiensis* has male counts of 17 and female counts of 15 and 16).

DESCRIPTION OF HOLOTYPE (male). *Coloration*: base color of carapace, mesosoma, metasoma, and pedipalps uniform dark yellowish brown; last metasomal segment and telson darker; walking legs slightly lighter; pectines white; eyes black; aculeus black; some dusky markings on legs.

Carapace: Anterior margin faintly crenulate; with median emargination; set with three pairs of erect brown bristles. Lateral eyes three per group, anterior eye largest in each group. Median eyes on low ocular tubercule; one pair of reddish bristles on tubercule behind diad, no similar pair on tubercules anterior to diad; diad less than ⅕ carapace width at that point. Carapace slightly lustrous; area of interocular triangle not conspicuously granular, remainder of carapace densely granular.

Mesosoma: Tergites with abundant granules; tergite 7 with two pairs of serrate to dentate lateral keels; one median keel set with irregular low rounded granules. Sternites smooth, lustrous and agranular; segment 7 with one pair of keels, these smooth to slightly crenulate; stigma long oval.

Metasoma: All dorsal and dorsolateral keels serrate to deeply crenulate except that dorsal keels of segment V absent; lateral keels serrate on posterior 5⁄6 of posterior I, anterior ⅓ of II, posterior ¼ of III, absent on IV, crenulate on anterior ⅕ of V; all inferior lateral keels well developed and deeply crenulate; inferior median keels smooth to obsolete on segments I to III, smooth to crenulate, but approaching obsolescence on IV, smooth to crenulate on V. Inferior intercarinal space of V agranular.

Telson: Vesicle broad and bulbous; ventral surface densely covered with low rounded granules obsolescent in appearance; broad subaculear tubercule; one pair of long brown hairs lateral to subaculear tubercule, a number of much shorter, less conspicuous hairs also present; dorsolateral aspect of vesicle granular. Aculeus short and well curved.

Pectines: Long and thick; 25/26 pectinal teeth; fulcra triangular; each middle lamella with one long reddish hair.

Genital operculum: Completely divided longitudinally; distinct genital papillae visible externally.

Chelicerae: Inferior border of movable finger completely lacking denticles; terminal tooth of superior border and terminal tooth of inferior border subequal with superior tooth smallest. Long brown bristle on superior base of fixed finger, this almost as long as fixed finger.

Pedipalps: Hand elongate with only slight swelling of palm; keels broad, rounded and agranular on the dorsolateral aspect of hand, keels granular medially; intercarinal spaces agranular; fingers elongate; fixed finger and movable finger each distinctly longer than carapace. Grasping edges of fingers not scalloped; very elongate, conspicuous terminal tooth on each finger; teeth extend to proximal bases of fingers; teeth do not meet proximally when chela closed, but leave narrow elongate space.

Standard measurements and photographs: Table 2 and figures 4 and 5.

Description of allotype (female). Coloration and patterns essentially the same as holotype. Structure essentially the same as holotype except: total body length longer; most body dimensions slightly greater; pectines with slightly fewer teeth (23/23 instead of 26/25); without genital papillae; genital operculum not completely divided longitudinally; vesicle hairs much longer, heavier and more conspicuous; pectinal teeth very short, proximal tooth in each comb longer than adjacent teeth.

Standard measurements: Table 2.

Variation within paratypes. Study of the 10 paratopotypes (6 males, 4 females) indicated little significant variation from the description of the holo-

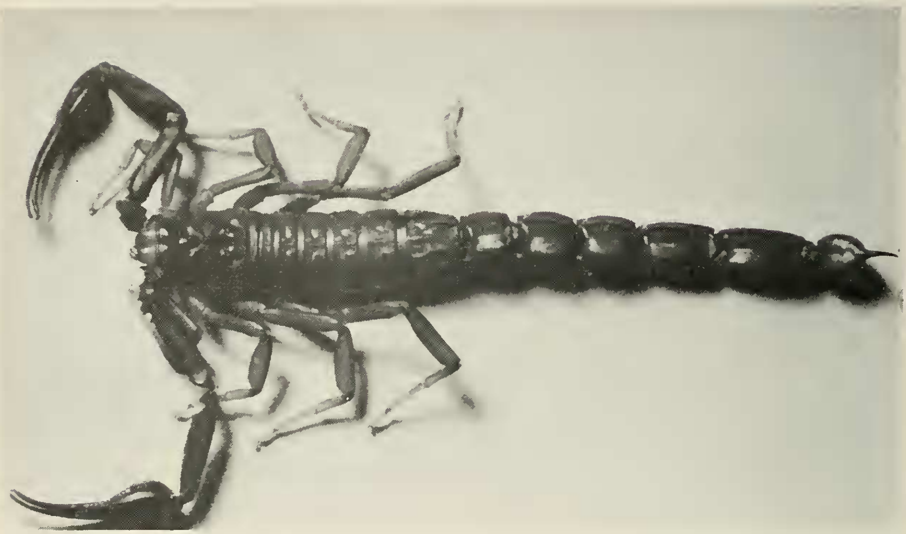

Figure 4. *Vejovis harbisoni,* new species. Dorsal view of holotype.

type and allotype. Males varied in total length from 35 to 51 millimeters, while females varied from 26 to 50 millimeters. Pectine tooth counts varied from 22 to 23 (predominantly 23) in females and from 25 to 27 (predominantly 25 and 26) in males. Most specimens were mature, but about one-fifth were juveniles.

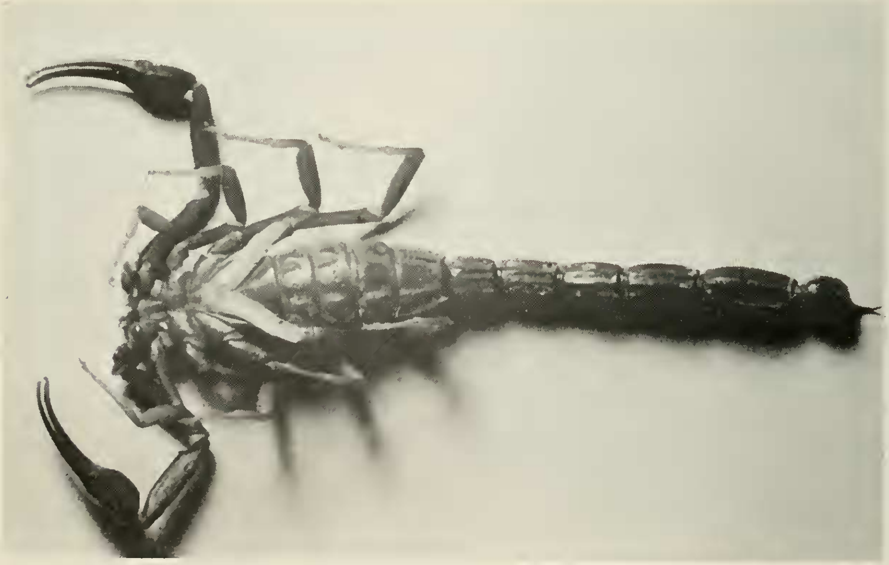

Figure 5. *Vejovis harbisoni,* new species. Ventral view of holotype.

TABLE 2. *Measurements (in millimeters) of* Vejovis harbisoni, *new species, holotype and allotype.*

	Holotype (male)	Allotype (female)
Total length	43.0	50.5
Carapace, length	5.4	6.0
width (at median eyes)	4.0	4.6
Mesosoma, length	12.4	17.3
Metasoma, length	20.0	21.2
segment I (length/width)	3.0/3.1	3.2/3.3
segment II (length/width)	3.5/3.1	3.6/3.0
segment III (length/width)	3.5/3.0	3.7/3.1
segment IV (length/width)	4.5/2.8	4.7/3.1
segment V (length/width)	5.5/2.9	6.0/3.1
Telson, length	5.2	6.0
Vesicle (length/width)	3.5/2.7	3.7/2.8
depth	2.0	2.2
Aculeus, length	1.7	2.3
Pedipalp		
Humerus (length/width)	6.2/1.3	6.6/1.5
Brachium (length/width)	6.5/1.5	6.9/1.7
Chela (length/width)	10.2/2.0	10.8/2.2
depth	2.3	2.7
movable finger, length	6.8	6.3
fixed finger, length	5.9	7.2
Pectines		
teeth (left/right)	26/25	23/23

Mature males and mature females attained about the same size in total body length but males tended to have slightly more elongate metasomas where as females had carapace and mesosoma both longer and wider. Adult females had vesicles differing from adult males in that they were less swollen, not as conspicuously tubercular, more hirsute in appearance, and with a slightly more prominent subaculear tubercule. Juveniles appeared morphologically similar to adults with the following exceptions: body color light dirty yellow not dark brown; cuticle with underlying dusky pigment over much of body; smaller in body size; telson lacking sexual dimorphism, not greatly swollen, relatively hirsute in both sexes. Juvenile and adult males with genital papillae visible externally. Specimens from outside the type locality were essentially the same in color and morphology with the following exceptions: one female specimen from near Bahía San Luis Gonzaga had a pectine tooth count of 21 (all other paratype females had 22 to 23 pectinal teeth); specimens from Bahía de Los Angeles had inferior median keel of metasomal segment V more smooth.

Type data and etymology. The holotype, allotype, and 10 paratopotypes (6 males, 4 females) were collected in Calamajue Arroyo, Baja California Norte, Mexico, 15 and 16 June 1968 by S. C. Williams and M. A. Cazier. The holotype and allotype are permanently deposited in the California Academy of Sciences.

This species is named "*harbisoni*" after Charles F. Harbison, Curator of Entomology, San Diego Museum of Natural History. Mr. Harbison has spent many years making biological explorations of Baja California, collected many of the first scorpion specimens known from Baja California, and over the years has encouraged many biology students to study the arthropod fauna of this region.

Material. In addition to the holotype, allotype, and 10 paratopotypes, 29 additional paratypes were studied from three other localities in Baja California. These records are as follows: Mexico, Baja California Norte: 6 miles north of Bahía San Luis Gonzaga, 13 June 1968 (S. C. Williams, M. A. Cazier, and party), 1 male, 1 female; 7 miles north of Bahía San Luis Gonzaga, 14 June 1968 (S. C. Williams, M. A. Cazier, and party), 2 females; Bahía de Los Angeles, elevation 25 feet, 18 June 1968 (S. C. Williams, M. A. Cazier, and party), 2 females; Bahía de Los Angeles, elevation 25 feet, 19 June 1968 (S. C. Williams, M. A. Cazier, and party), 1 male, 4 females.

Comment. This species lives in the rocky volcanic habitats occurring in the north eastern regions of the Baja California Peninsula (fig. 6). Here it is found in rock slides, and along rocky slopes where it occurs in the spaces created by accumulated fragmented rock. In the evenings, individuals of this species may come to the surface rocks. During the day, however, this species apparently resides deep enough in the rock deposits that collection by rock rolling is unproductive. Even in the most favorable habitats known, this species has never been found in abundance. Males and females were found in approximately equivalent numbers and juveniles were encountered about as frequently as adults. All specimens were collected using the ultraviolet detection method.

Vejovis minutis Williams, new species.

(Figures 7, 8.)

Diagnosis. One of the smallest species of *Vejovis* known; uniform brownish in color, lacking stripes or other conspicuous markings; chelicerae lacking denticles on inferior margin of movable finger; pedipalps with very elongate fingers, each terminating in a long tooth; pedipalp palms not greatly swollen; pectinal teeth 11 to 13 in females, 12 to 15 in males; inferior lateral keels of metasoma crenulate; inferior median keels of metasoma obsolete on segments I to III.

Vejovis minutis belongs to the "*wupatkiensis*" group of *Vejovis*. It is the smallest known species in this group and is related to *Vejovis gertschi* Williams.

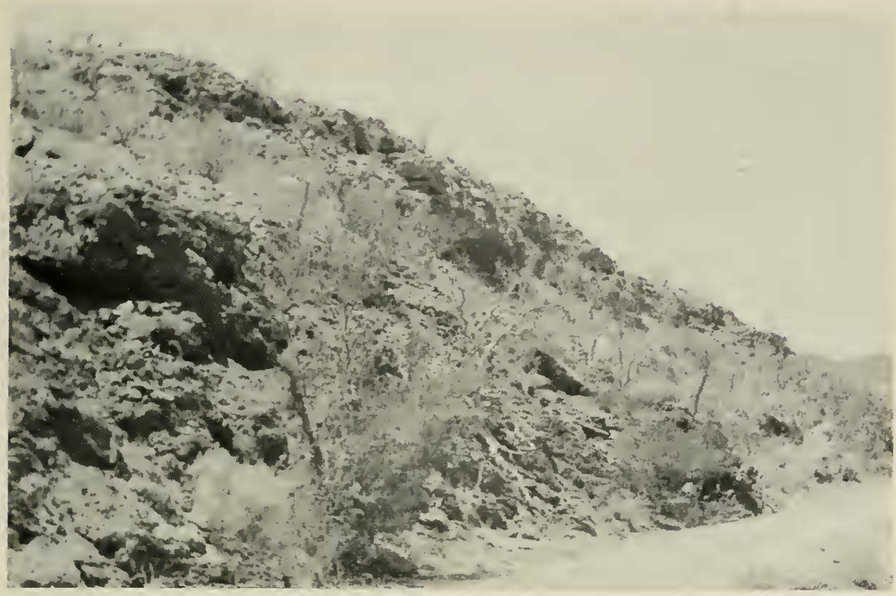

Figure 6. Type locality and habitat of *Vejovis harbisoni,* in Calamajue Arroyo, Baja California Norte, Mexico, 15 June 1968.

It is easily distinguished from *V. gertschi* by its smaller pectines, reduced pectine tooth count, and less distinctly developed inferior metasomal keels.

Description of holotype (male). *Coloration*: Base color of entire body uniform light yellow; walking legs and pectines slightly lighter; carapace and

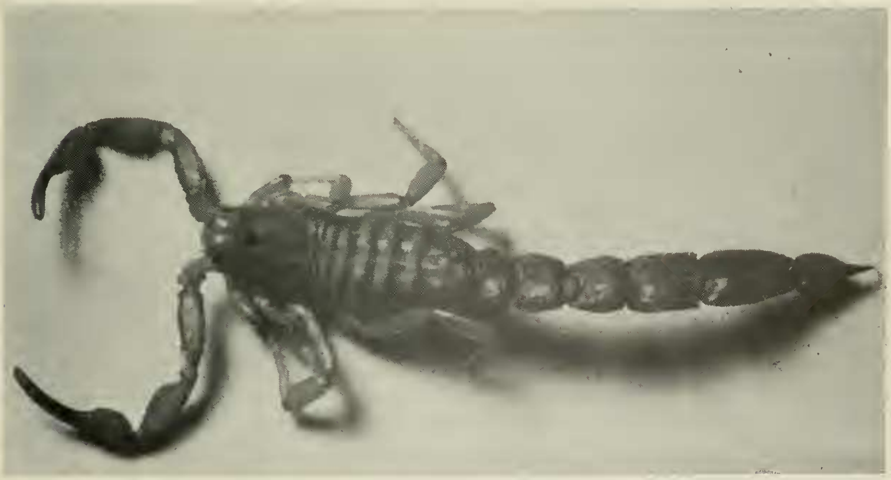

Figure 7. *Vejovis minutis,* new species. Dorsal view of holotype.

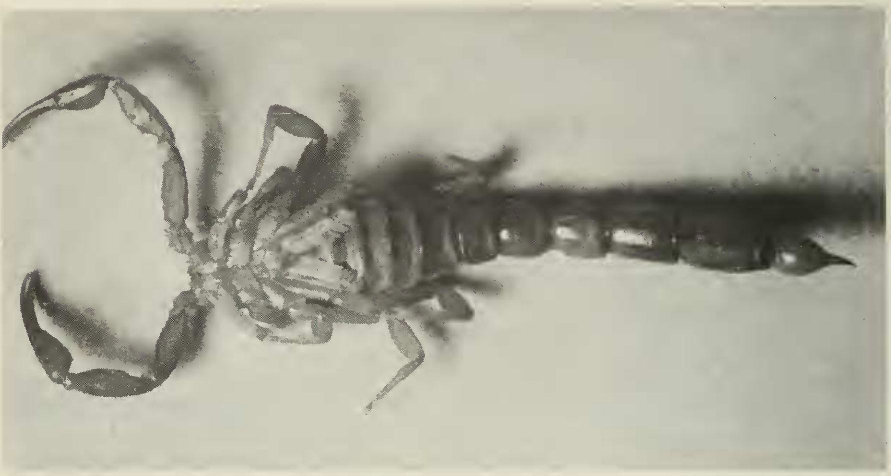

FIGURE 8. *Vejovis minutis,* new species. Ventral view of holotype.

dorsum of mesosoma with underlying dusky markings; eyes black; aculeus reddish brown; some dusky markings on regions of pedipalps and legs.

Carapace: Anterior margin with broad median emargination and three pairs of fine brown hairs. Three lateral eyes in each group; anterior two eyes largest in each group; median diad less than ¼ carapace width at that point; a pair of long brown hairs on ocular tubercule posterior to diad. Carapace surface smooth to finely granulate.

Mesosoma: Tergites smooth to finely granulate; last tergite with two pairs of granulate lateral keels and a smooth median keel. Sternites smooth and agranulate; sternite 7 with one pair of keels, these smooth to finely granulate. Stigma small and oval.

Metasoma: Dorsal and dorsolateral keels crenulate on all segments except that dorsals absent on segment V; lateral keels crenulate on posterior ⅚ of segments I to II, posterior ½ of III, absent on IV, obsolete to slightly crenulate on V; inferior lateral keels crenulate; inferior median keels obsolete on segments I to III, reduced and smooth to slightly crenulate on IV, crenulate on V. Inferior intercarinal space of segment V agranulate.

Telson: Basically smooth and agranulate; ventral surface of vesicle with about 13 to 15 pairs of long brown hairs, many approaching aculeus in length; very subtle subaculear tubercule.

Pectines: Small with relatively long teeth; 13 pectinal teeth; inferior surface with little hirsuteness.

Genital operculum: Completely divided longitudinally; genital papillae visible externally but not conspicuous.

Chelicerae: Inferior border of movable finger completely lacking denticles.

Table 3. *Measurements (in millimeters) of* Vejovis minutis, *new species, holotype and allotype.*

	Holotype (male)	Allotype (female)
Total length	14.7	17.8
Carapace, length	2.3	2.7
width (at median eyes)	1.7	2.0
Mesosoma, length	3.3	5.3
Metasoma, length	7.1	7.5
segment I (length/width)	1.0/1.4	1.0/1.5
segment II (length/width)	1.1/1.4	1.2/1.4
segment III (length/width)	1.2/1.3	1.2/1.4
segment IV (length/width)	1.6/1.3	1.7/1.4
segment V (length/width)	2.2/1.3	2.4/1.4
Telson, length	2.0	2.3
Vesicle (length/width)	1.3/0.9	1.4/1.1
depth	0.7	0.7
Aculeus, length	0.7	0.9
Pedipalp		
Humerus (length/width)	1.9/0.7	2.2/0.7
Brachium (length/width)	2.0/0.7	2.4/0.9
Chela (length/width)	3.2/0.7	3.8/0.9
depth	0.7	0.9
movable finger, length	2.0	2.5
fixed finger, length	1.7	2.0
Pectines		
teeth (left/right)	13/13	12/12

Pedipalps: Chela distinctly elongate; palms only slightly swollen; keels on palm smooth to obsolete except that those on medial aspect show some granulation; fingers elongate but movable and fixed finger each shorter than carapace; grasping edges of chela not scalloped, each finger terminates distally in a conspicuously long, overhanging, terminal tooth.

Standard measurements and photographs: Table 3 and figures 7 and 8.

Description of allotype (female). Coloration and structure essentially the same as holotype except: overall length greater; most body dimensions slightly greater; pectines with slightly fewer teeth (12 instead of 13); without genital papillae; genital operculum not completely divided longitudinally; vesicle with some low rounded granules.

Standard measurements: Table 3.

Variation within paratypes. Study of 36 paratopotypes (21 males, 15 females) indicated little variation from the color and structure of the holotype and allotype. Males varied in total length from 13 to 17 millimeters, while females varied from 15 to 20 millimeters. Pectine tooth counts varied from 11 to 13 (predominantly 12) and from 12 to 15 (predominantly 13) in males. Little sexual dimorphism occurs. Males and females have overlapping pectinal tooth counts, and are very similar in size, color, and morphology. Males may be distinguished by the following characters: genital papillae present (sometimes hard to see); genital operculum completely divided longitudinally; slightly slimmer mesosoma; pectinal teeth longer in length; hairs on vesicle not as stout.

Type data and etymology. The holotype, allotype, and 36 paratopotypes were collected 5 miles southwest of La Paz, Baja California Sur, Mexico, 3 August 1968 by S. C. Williams, M. A. Cazier, and party. The holotype and allotype are permanently deposited in the California Academy of Sciences.

This species is named "*minutis*" because of its very tiny size.

Material. In addition to the holotype, allotype, and 36 paratopotypes, 19 additional paratypes were studied. These paratypes came from the following three localities in Baja California Sur, Mexico: 2.9 miles northwest of San Antonio, elevation 1400 feet, 24 July 1968 (S. C. Williams and M. Bentzien), 2 males, 1 female; Las Cruces, 29 July 1968 (S. C. Williams, M. A. Cazier, and party), 9 females; Las Cruces and for 5 miles southwest, 30 July 1968 (S. C. Williams, M. A. Cazier, and party), 7 females.

Comment. This species appears to have a rather specialized habitat requirement judging by the few samples which included it. It was most abundant in the type locality near La Paz where it was found in relatively dense vegetation growing on low, flat, poorly drained terrain (fig. 9). The soils were fine textured, moderately well packed and with a moderate covering of litter under the denser vegetation. This species was, even in this habitat, one of the least abundant species in the samples which were dominated by scorpions of the genus *Bioculus*. Young instars were completely absent in the samples, and all specimens were collected by means of ultraviolet detection.

Vejovis vittatus Williams, new species.

(Figures 10, 11.)

Diagnosis. Medium to small species of *Vejovis* with yellow base color and two pairs of dorsal mesosomal stripes; inferior median and inferior lateral keels of metasoma with underlying irregular dark pigmentation giving the appearance of two pairs of dotted lines; blotches of dusky pigment over much of the body gives this species a speckled appearance. Pedipalp palms not very swollen; fingers shorter than carapace; frontal margin of carapace with four or five pairs of bristles and one median hair; inferior border of movable cheliceral finger completely lacking denticles; pectinal teeth 18 to 22 in males, 15 to 18 in females.

Very closely related to *Vejovis punctatus punctatus* Karsch from which it differs in the following ways: mature individuals with smaller body size; frontal

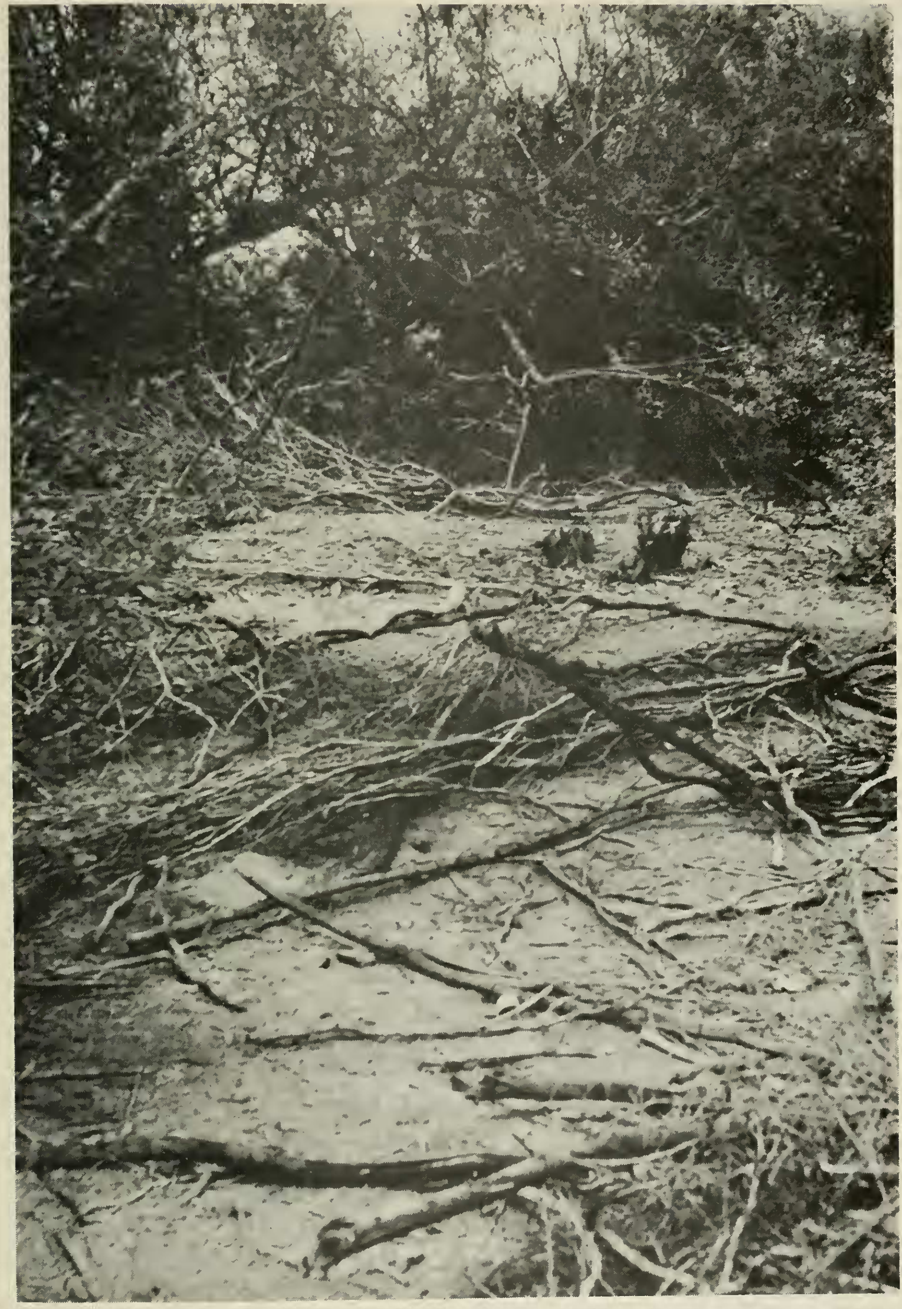

FIGURE 9. Type locality and habitat of *Vejovis minutis,* 5 miles southwest of La Paz, Baja California Sur, Mexico, 31 July 1968.

margin of carapace with four or five pairs of bristles and one median bristle (compared with three pairs and no median bristle); inferior lateral keels of metasoma crenulate (these smooth on *punctatus*); lacks the proximal scallop on the pedipalp chela of mature males.

Description of holotype (male). *Coloration*: Base color of carapace, mesosoma, metasoma, pedipalps, and walking legs uniform yellow; telson slightly darker; pectines whitish. Carapace with underlying, conspicuous black color markings; dorsum of mesosoma with black blotches on tergites forming two pairs of distinct longitudinal stripes—these approaching obsolescence; dorsal keels of metasoma with obsolescent underlying dusky pigment; inferior median and inferior lateral keels of metasoma with distinct but obsolescent underlying dark pigmentation; inferior surface of metasomal segment V with a number of irregular but distinct dusky blotches; ventral surface of vesicle with a number of faint dusky blotches, pedipalps and walking legs with a number of dusky areas. Ocular tubercule black; eyes black; chela fingers amber; cheliceral teeth reddish amber; aculeus black.

Carapace: Anterior margin slightly crenulate, with subtle median emargination, this margin set with nine reddish bristles (four pairs and one median). Lateral eyes three per group, anterior eye largest. One pair of bristles on ocular tubercule anterior to diad, and a similar pair on ocular tubercule posterior to diad; diad slightly less than ¼ carapace width at that point. Carapace surface densely granulate.

Mesosoma: Tergites densely granulate, segment 7 with two pairs of dentate lateral keels and one crenulate median keel. Sternites smooth, agranulate and lustrous; one pair of crenulate keels on sternite 7; stigma long oval.

Metasoma: All dorsal and dorsolateral keels serrate except that dorsal keels of segment V absent, dorsal keels of segments I to III each terminate posteriorly as an enlarged spine; dorsolateral keels on segments II and III each terminate posteriorly as an enlarged spine; lateral keels serrate on posterior ⅚ of segment I, posterior ½ of II, posterior ¼ of III, absent on IV, irregularly crenulate on anterior ⅓ of V; inferior lateral keels irregularly serrate to crenulate on segments I to IV, serrate on segment V; inferior median keels completely absent on segments I to III, obsolete on IV, appearing as several isolated irregular granules, serrate on V. Entire inferior intercarinal space of V granulate.

Telson: Ventral surface of vesicle smooth and lustrous, lacking granulation; with about 12 to 15 pairs of fine, long, brownish hairs; distinct subaculear tubercule; dorsal surface of vesicle with broad anterior pair of keels, each terminating laterally as a distinct spine.

Pectines: Pectines long and thick; 22 pectinal teeth; pectinal teeth very long; triangular fulcra; abundant reddish hairs, these most numerous on fulcra, middle lamellae and anterior margin.

Genital operculum: Completely divided longitudinally; genital papillae distinctly visible externally.

Chelicerae: Inferior border of movable finger completely lacking denticles; terminal tooth of inferior margin and terminal tooth of superior margin of movable finger subequal with superior tooth greatly reduced in size. Large reddish bristle on superior base of fixed finger, this approximating fixed finger in length.

Pedipalps: Palms moderately swollen; keels obsolete; surface of palm smooth, agranulate, and lustrous. Fixed finger and movable finger each distinctly shorter than carapace length. Grasping edges of chela not scalloped; teeth extend to proximal ends of fingers; long, narrow, proximal open space between fingers when chela closed.

Standard measurements and photographs: Table 4 and figures 10 and 11.

Description of allotype (female). Coloration and color patterns essentially the same as holotype. Structure essentially the same as holotype except: slightly longer total length and with most body dimensions slightly larger; pectine teeth fewer (17 instead of 22); with more bristles on anterior margin of carapace (five pairs of laterals and one median); much more pronounced subaculear tubercule: hairs on ventral surface of telson much coarser, longer and more conspicuous.

Standard measurements: Table 4.

Variation within paratypes. Study of 304 paratopotypes (222 males, 82 females) indicated little variation from the description of holotype and allotype. Males varied in total length from 26 to 36 millimeters while females varied from 27 to 41 millimeters. Young instars were completely lacking in the samples. Mature females tended to reach slightly larger size in overall length and most body proportions. Pectine tooth counts varied in the males from 19 to 22 (predominantly 21), while female pectine tooth counts varied from 16 to 18 (predominantly 17). Little sexual dimorphism was apparent with the following exceptions: males with larger pectines, these with longer and more numerous teeth; females with more pointed subaculear tubercule and with area around subaculear tubercule with more irregular surface texture; males with genital papillae visible externally and with genital operculum completely divided longitudinally; ventral surface of female vesicle appearing more hirsute because of more stout development of hairs. One female, apparently a second or third instar, was collected 75 miles northwest of La Paz. This specimen had the cuticle somewhat lighter than the adults, but had the same patterns of stripes on the dorsum and on the inferior surface of the metasoma.

Throughout the range of distribution, the paratypes were, in general, remarkably similar. In several locations, light color races occurred, notably on Isla Espiritu Santo, Isla Partida, and Las Cruces. These light phases were characterized by lighter yellow base cuticle and dorsal stripes being less distinct. The populations on Isla Espiritu Santo and Isla Partida also differed from

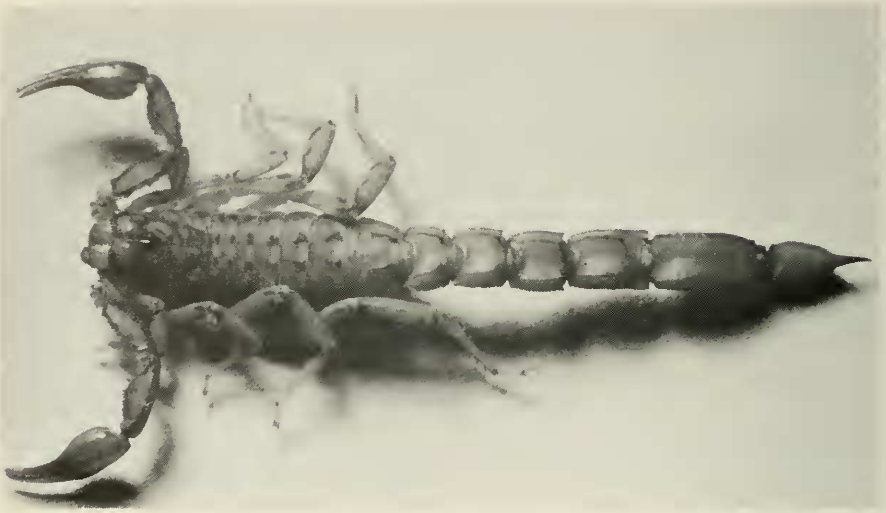

FIGURE 10. *Vejovis vittatus,* new species. Dorsal view of holotype.

those of the adjacent peninsula in having inferior lateral keels of metasoma slightly more reduced and less deeply crenulate. In the southern part of the range the pectinal tooth count tended to be slightly less than in the northern part of the range. Several males were found to have pectinal tooth counts as low as 18 and several females were found to have counts as low as 15 (these low counts were not common, however).

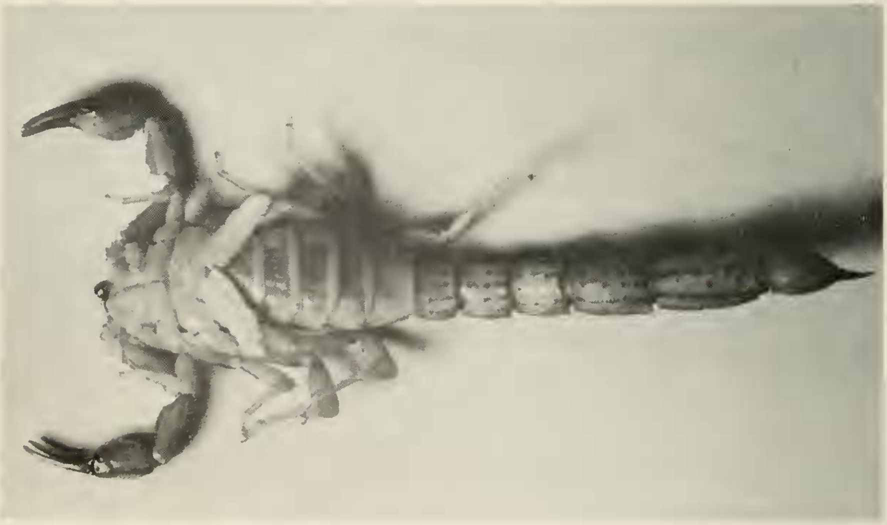

FIGURE 11. *Vejovis vittatus,* new species. Ventral view of holotype.

Table 4. *Measurements (in millimeters) of* Vejovis vittatus, *new species, holotype and allotype.*

	Holotype (male)	Allotype (female)
Total length	32.8	35.3
Carapace, length	4.4	4.8
width (at median eyes)	3.2	3.6
Mesosoma, length	8.2	10.3
Metasoma, length	15.3	15.5
segment I (length/width)	2.0/2.6	2.0/3.0
segment II (length/width)	2.3/2.6	2.4/2.9
segment III (length/width)	2.5/2.6	2.6/2.8
segment IV (length/width)	3.5/2.6	3.5/2.8
segment V (length/width)	5.0/2.6	5.0/2.7
Telson, length	4.9	4.7
Vesicle (length/width)	3.2/2.0	3.0/2.1
depth	1.5	1.5
Aculeus, length	1.7	1.7
Pedipalp		
Humerus (length/width)	3.3/1.1	3.5/1.2
Brachium (length/width)	3.6/1.4	3.8/1.5
Chela (length/width)	5.6/1.7	5.7/1.5
depth	1.9	1.7
movable finger, length	3.3	3.5
fixed finger, length	2.5	2.5
Pectines		
teeth (left/right)	22/22	17/17

Type data and etymology. The holotype, allotype, and 304 paratopotypes were collected 5 miles southwest of San Miguel de Comondu, Baja California Sur, 2 and 3 July 1968 by S. C. Williams, M. A. Cazier, and party. The holotype and allotype are permanently deposited in the California Academy of Sciences.

This species is name "*vittatus*" because of the conspicuous striped appearance of the mesosomal dorsum.

Material. In addition to the holotype, allotype, and 304 paratopotypes, 1082 (636 males, 446 females) additional paratypes were studied from some 36 other locations. These specimens were collected in the following locations in Baja California Sur, Mexico: 75 miles northwest of La Paz, elevation 200 feet, 4 July 1968 (S. C. Williams, M. A. Cazier, and party), 50 males, 18 females; 5 to 6 miles southwest of La Paz, elevation 25 feet, 5 July 1968 (S. C. Williams, M. A. Cazier, and party), 27 males, 11 females; 2 miles east of La Paz, elevation 50 feet, 5 July 1968 (S. C. Williams, M. A. Cazier, and party), 4 males; 5 to 10 miles west of La Paz, elevation 25 feet, 6 July 1968 (S. C. Williams, M. A. Cazier, and party), 11 males, 17 females; 5 to 6 miles southwest of La Paz, elevation sea level, 6 July 1968 (S. C. Williams, M. A. Cazier, and party), 35 males, 15 females; 1 mile south of La Paz, elevation 100 feet, 6 July 1968 (S. C. Williams, M. A. Cazier, and party), 7 males, 11 females; Isla Espiritu Santo, elevation sea level, 7 July 1968 (S. C. Williams, M. Bentzien, and W. Fox), 4 females; Isla Partida, 9 July 1968 (S. C. Williams, M. Bentzien, and W. Fox), 19 males, 6 females; Isla Partida, 10 July 1968 (S. C. Williams, M. Bentzien, and W. Fox), 1 male, 1 female; 1 mile east of Los Aripes, 8 July 1968 (M. A. Cazier, J. Bigelow, and N. Leppla), 24 males, 8 females; 14 miles northeast of La Paz, 10 July 1968 (M. A. Cazier, J. Bigelow, and N. Leppla), 2 males; 14 miles northeast of La Paz, 14 July 1968 (S. C. Williams and party), 3 males, 2 females; 1.5 mile northeast of Punta Palmilla, 16 July 1968 (S. C. Williams, M. A. Cazier, and party), 89 males, 56 females; 1.5 mile northeast of Punta Palmilla, 17 July 1968 (S. C. Williams, M. A. Cazier, and party), 10 males, 14 females; 2.2 miles southwest of Punta Palmilla, elevation 30 feet, 17 July 1968 (S. C. Williams, M. A. Cazier, and party), 3 females; 3.5 miles southwest of Punta Palmilla, elevation 30 feet, 17 July 1968 (S. C. Williams, M. A. Cazier, and party), 10 males, 10 females; 3.9 miles southwest of Punta Palmilla, elevation 30 feet, 17 July 1968 (S. C. Williams, M. A. Cazier, and party), 47 males, 42 females; 3 miles east of Cabo San Lucas, elevation 30 feet, 18 July 1968 (S. C. Williams, M. A. Cazier, and party), 2 males; Cabo San Lucas, elevation 30 feet, 19 July 1968 (S. C. Williams, M. A. Cazier, and party), 9 males, 4 females; Cabo San Lucas, elevation 30 feet, 20 July 1968 (S. C. Williams, M. A. Cazier, and party), 7 males, 3 females; 2 miles north of Cabo San Lucas, elevation 30 feet, 20 July 1968 (S. C. Williams, M. A. Cazier, and party), 6 males; 6 miles north of Cabo San Lucas, elevation 50 feet, 21 July 1968 (S. C. Williams, M. A. Cazier, and party), 10 males, 4 females; 5 miles north of Cabo San Lucas, elevation 50 feet, 21 July 1968 (S. C. Williams, M. A. Cazier, and party), 1 male, 2 females; 4 miles north of Cabo San Lucas, elevation 50 feet, 21 July 1968 (S. C. Williams, M. A. Cazier, and party), 7 males, 1 female; 3 miles east of Cabo San Lucas, elevation 50 feet, 22 July 1968 (S. C. Williams, M. A. Cazier, and party), 4 males, 2 females; 16.5 miles northwest of Cabo San Lucas, 23 July 1968 (S. C. Williams, W. Fox, and M. Bentzien), 1 male; 2 miles northwest of Los Pozos, 23 July 1968 (S. C. Williams, M. Bentzien, and W. Fox), 1 male, 3 females; 4 miles north of Tinaja, 23 July 1968 (S. C. Williams, M. Bentzien, and W. Fox), 3 males, 1 female; 3.5 miles south of El Pescadero, elevation 20 to 25 feet, 23 July 1968 (S. C. Williams, M. A. Cazier, and party), 80 males, 33 females; 5.9 miles north of Todos Santos, elevation 500 feet, 24 July 1968 (S. C. Williams, W. Fox, and M. Bentzien), 7 males, 4 females; 14.8 miles north of Todos Santos, elevation 500 feet, 24 July 1968 (S. C. Williams, W. Fox, and M. Bentzien), 1 male, 1

female; 2.9 miles northwest of San Antonio, elevation 1400 feet, 24 July 1968 (S. C. Williams and M. Bentzien), 25 males, 13 females; 6.8 miles southeast of San Antonio, elevation 1400 feet, 24 July 1968 (S. C. Williams and M. Bentzien), 17 males, 24 females; 0.5 mile east of San Bartolo, elevation 1200 feet, 24 July 1968 (S. C. Williams and M. Bentzien), 4 males, 1 female; 2.5 miles east of San Bartolo, elevation 1200 feet, 24 July 1968 (S. C. Williams and M. Bentzien), 1 male, 4 females; 9.6 miles west of Los Aripes, elevation 400 feet, 25 July 1968 (S. C. Williams, M. Bentzien, and J. Bigelow), 1 female; 11.9 miles west of Los Aripes, elevation 800 feet, 25 July 1968 (S. C. Williams, M. Bentzien, and J. Bigelow), 11 males, 10 females; 21.4 miles west of Los Aripes, elevation 900 feet, 25 July 1968 (S. C. Williams, M. Bentzien, and J. Bigelow), 5 males, 10 females; 31 miles west of Los Aripes, elevation 800 feet, 25 July 1968 (S. C. Williams, M. Bentzien, and J. Bigelow), 5 males, 4 females; 10.5 miles west of El Crucero, 26 July 1968 (S. C. Williams, M. A. Cazier, and party), 1 male, 2 females; 10.3 miles southeast of Santa Rita, 27 July 1968 (S. C. Williams, M. Bentzien, and J. Bigelow), 10 males, 9 females; 35.3 miles northwest of Los Aripes, 27 July 1968 (S. C. Williams, M. Bentzien, and J. Bigelow), 1 male, 1 Bentzien, and J. Bigelow), 1 male, 1 female; 15.0 miles northwest of Los Aripes, female; 49.3 miles southeast Santa Rita, 27 July 1968 (S. C. Williams, M. 27 July 1968 (S. C. Williams, M. Bentzien, and J. Bigelow), 5 males, 2 females; Las Cruces, 29 July 1968 (S. C. Williams, M. A. Cazier, and party), 39 males, 64 females; Las Cruces and for 5 miles southwest, 30 July 1968 (S. C. Williams, M. A. Cazier, and party), 27 males, 19 females.

Comment. This species was found throughout the southern part of the peninsula from Comondu to Cabo San Lucas. It was one of the most frequently encountered of all the *Vejovis* species and was commonly a dominant in the samples. It tended to prefer rocky habitats where considerable fine textured soil also occurred (fig. 12) but was also found in areas away from rocky outcrops. The lack of young instars in the samples was conspicuous. Only one young instar, probably a second or third instar, was collected in all of the samples. The sex ratios significantly favoring males in most of the samples were also conspicuous.

Vejovis pumilis Williams, new species.

(Figures 13, 14.)

Diagnosis. Very minute in size ranking among the smallest species of *Vejovis* known; total length less than 30 millimeters. Base color of body uniform pale yellow; mature males with distinctive dark orange telson; both sexes with reddish pedipalp fingers; no other contrasting markings. Pedipalps with short fingers and swollen hands; pectines with 7 to 8 teeth in females, 12 to 16 teeth in males; no denticles on inferior border of movable cheliceral finger.

Description of holotype (male). *Coloration*: carapace, mesosoma, meta-

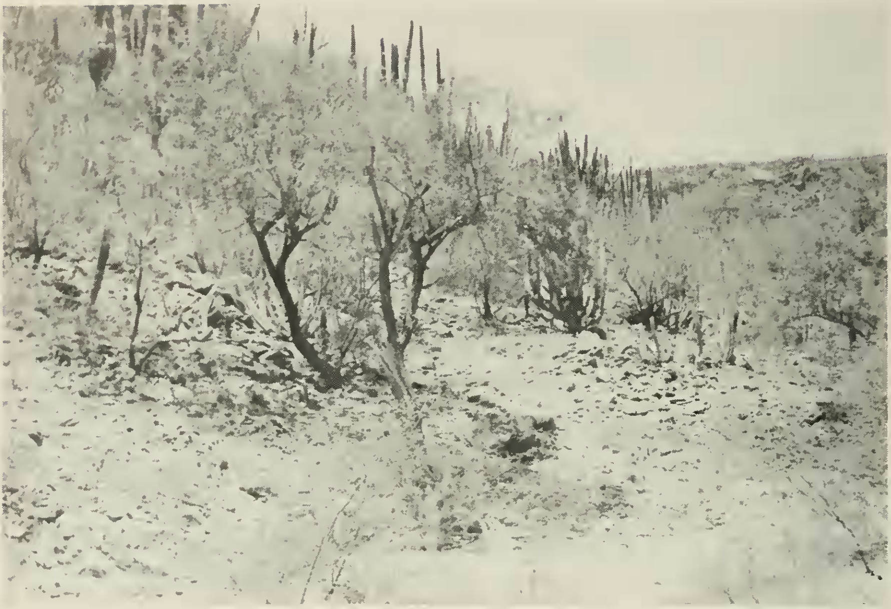

Figure 12. Type locality and habitat of *Vejovis vittatus* and *Vejovis bruneus*, 5 miles southwest of San Miguel de Comondu, Baja California Sur, Mexico, 3 July 1968.

soma, pedipalps, and walking legs uniformly yellowish white. Only contrasting markings: telson orange; pedipalp fingers pinkish; pectines almost white; carapace and dorsum of mesosoma with faint underlying dusky pigmentation; eyes black, some dusky markings on legs.

Carapace: Anterior margin convex; no median emargination; seven reddish bristles. Lateral eyes small and three per group; median diad 2/9 carapace width at that point. Carapace surface irregular and finely granulate.

Mesosoma: Tergites densely covered with fine granules; two pairs of lateral keels on tergite 7, these not well developed, but set with irregular dentate granules; tergite 7 with obsolescent median keel. Sternites agranulate and lustrous; stigma inconspicuous and long oval; one pair of poorly developed keels on sternum 7, these smooth to crenulate.

Metasoma: Dorsal and dorsolateral keels of segments I to IV set with irregular short dentate granules, segment V lacking dorsal keels and with dorsolaterals almost smooth, no enlarged terminal spines; lateral keels serrate on posterior 5/6 of segment I, ¾ of segment II, ¼ of segment III, absent on IV, these keels rounded and approaching obsolescence on anterior ½ of V; all inferior lateral keels crenulate to serrate; inferior median keels smooth to obsolete on I, smooth on II, smooth to crenulate on III and IV, irregularly serrate

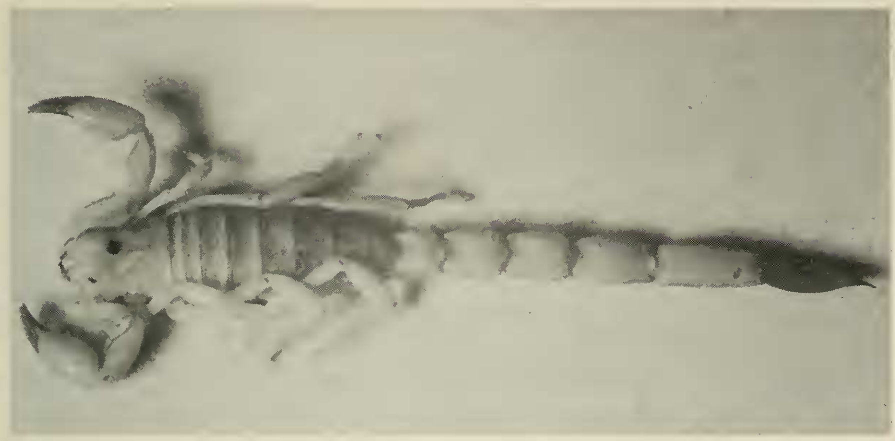

Figure 13. *Vejovis pumilis,* new species. Dorsal view of holotype.

on V. Inferior intercarinal space of V granulate; inferior median keels of segments I to IV set with two to four reddish bristles.

Telson: Ventral surface of vesicle smooth, lustrous and agranulate; this surface with about 12 pairs of short reddish hairs; no subaculear tubercule; aculeus very short, only about ⅕ vesicle length; vesicle not bulbous but elongate.

Pectines: Long and thick; 13 pectinal teeth; fulcra triangular.

Genital operculum: Completely divided longitudinally; distinct genital papillae visible externally.

Chelicerae: Inferior border of movable finger completely lacking denticles; terminal tooth of inferior and superior borders not subequal, superior terminal

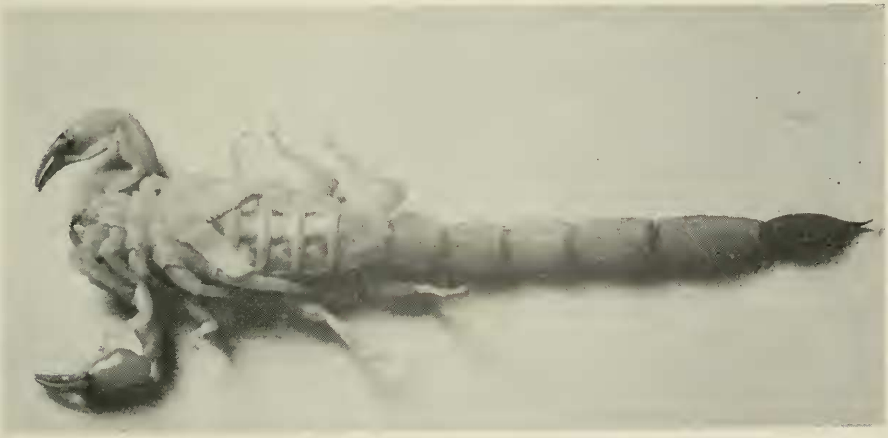

Figure 14. *Vejovis pumilis,* new species. Ventral view of holotype.

tooth greatly reduced. Long brownish hair extends from superior base of fixed finger to beyond distal end of finger.

Pedipalps: Palms swollen; fingers short compared with palm, fixed finger about ⅓ the length of chela; keels absent, hand smooth, agranulate and lustrous; movable finger and fixed finger each distinctly shorter than carapace. Grasping edge of fingers not scalloped except for one large scallop over the proximal ¼ of fingers, fingers do not meet in this scallop but leave large open space when chela closed; teeth do not extend to proximal ends of fingers.

Standard measurements and photographs: Table 5 and figures 13 and 14.

DESCRIPTION OF ALLOTYPE (female). Coloration and patterns essentially same as holotype with the following exceptions: lacks bright orange telson, telson similar to metasoma in color; mesosoma slightly darker. Structure essentially the same as holotype except: pectine teeth about ⅓ fewer (7/8 instead of 13/13); pedipalp chela not so conspicuously swollen; no large proximal space when chela closed; dorsum relatively smooth and lustrous; keelation of metasoma distinctly reduced, inferior median keels of segments I to IV obsolete, inferior lateral keels of segments I to IV obsolete to slightly crenulate, dorsal and dorsolateral keels more rounded and reduced; vesicle bulbous and not elongate, ventral surface appearing very hirsute with numerous coarse reddish hairs; aculeus proportionally much longer; genital operculum not completely divided longitudinally; no genital papillae.

Standard measurements: Table 5.

VARIATION WITHIN PARATYPES. Study of 106 paratopotypes (97 males, 9 females) indicated little variation from the description of holotype and allotype. Males varied in total length from 21 to 27 millimeters (predominantly 25 millimeters), while females varied from 20 to 24 millimeters (predominantly 23 millimeters). Most specimens of both sexes appeared to be mature. Mature females appeared to approximate the mature males in most body proportions. Females showed a definite tendency toward the obsolescence of inferior metasomal keels as compared with the males. Sexual dimorphism was distinct in that the males had a conspicuous orange telson whereas the females had telsons colored similar to the rest of the cuticle. Other sexual dimorphism occurred as follows: males with distinctly more swollen palms, enlarged pectines, greater pectine tooth counts, genital papillae, completely divided genital operculum, and better developed inferior metasomal keels. The younger instars were conspicuously few but were essentially similar to the adults with the following exceptions: younger males with pedipalp palms not quite so swollen, and with telson not as deep an orange as adult males. Pectine teeth varied from 12 to 16 (predominantly 13 and 14) in males, and from 7 to 8 in females. The male pectine tooth count of 15 and 16 was a rare occurrence and was represented by a single male with a 15/16 count.

Table 5. *Measurements (in millimeters) of* Vejovis pumilis, *new species, holotype and allotype.*

	Holotype (male)	Allotype (female)
Total length	26.5	24.4
Carapace, length	3.1	3.4
width (at median eyes)	2.2	2.5
Mesosoma, length	7.2	7.3
Metasoma, length	12.4	10.7
segment I (length/width)	1.7/1.7	1.5/1.7
segment II (length/width)	2.0/1.7	1.8/1.7
segment III (length/width)	2.2/1.7	1.9/1.6
segment IV (length/width)	2.8/1.6	2.3/1.5
segment V (length/width)	3.7/1.5	3.2/1.4
Telson, length	3.8	3.0
Vesicle (length/width)	3.2/1.1	1.9/1.1
depth	1.0	1.0
Aculeus, length	0.6	1.1
Pedipalp		
Humerus (length/width)	2.2/0.8	1.9/0.8
Brachium (length/width)	2.3/1.1	2.2/1.1
Chela (length/width)	4.0/1.4	3.4/1.0
depth	1.4	1.0
movable finger, length	2.0	1.8
fixed finger, length	1.3	1.2
Pectines		
teeth (left/right)	13/13	7/8

Type data and etymology. The holotype, allotype, and 106 paratopotypes were collected 26.8 miles west of El Crucero, Baja California Sur, Mexico, 26 July 1968 by S. C. Williams, M. A. Cazier, J. Bigelow, and M. Bentzien. The holotype and allotype are permanently deposited in the California Academy of Sciences.

This species is named "*pumilis*" because of its characteristic and distinctive dwarf appearance.

Material. In addition to the holotype, allotype, and 106 paratopotypes, 135 additional paratypes were studied from six other localities in Baja California. These records are as follows: Mexico, Baja California Sur: 28.9 miles west of El Crucero, elevation 25 feet, 26 July 1968 (S. C. Williams, M. A. Cazier, and party), 13 males; 21.4 miles west of El Crucero, elevation 75 feet, 26 July 1968 (S. C. Williams, M. A. Cazier, and party), 104 males, 10 females; 35.5 miles northwest of Los Aripes, elevation 600 feet, 27 July 1968 (S. C. Williams, M. Bentzien, and J. Bigelow), 1 male; 21.4 miles west of Los Aripes,

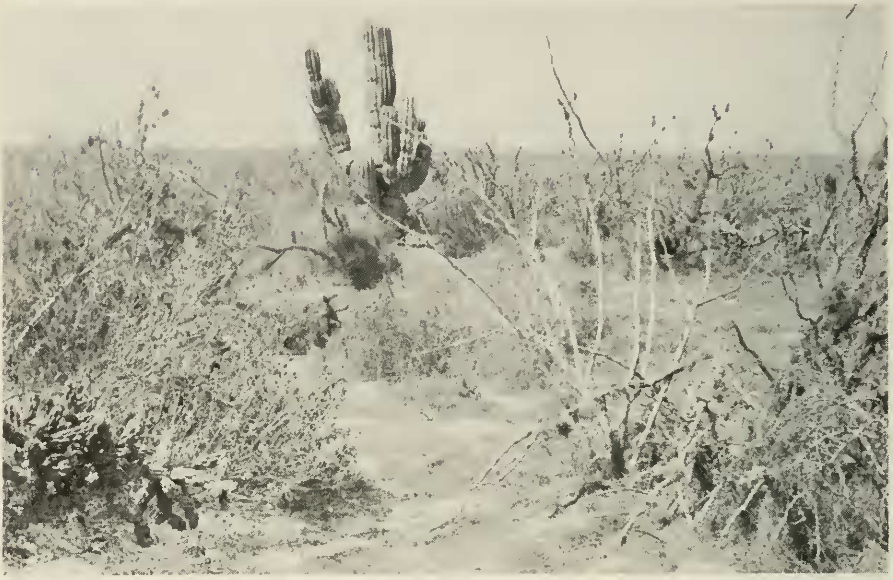

Figure 15. Habitat of *Vejovis pumilis* and *Vejovis diazi* near type locality. Photograph was taken on Magdalena Plain, 26 miles west of El Crucero, Baja California Sur, Mexico, 27 July 1968.

elevation 900 feet, 25 July 1968 (S. C. Williams, M. Bentzien, and J. Bigelow), 1 male, 1 female; 11.9 miles west of Los Aripes, elevation 800 feet, 25 July 1968 (S. C. Williams, M. Bentzien, and J. Bigelow), 4 males; 8 miles northwest of San Raymundo, elevation 500 feet, 30 June 1968 (S. C. Williams, M. A. Cazier, and party), 1 female.

Comment. This species appears to have a very limited geographic distribution occurring from near San Raymundo to a few miles north of La Paz. Its populations reached the greatest density on the Magdalena Plain (fig. 15) whereas populations located outside of this area appeared to occur in significantly reduced densities. This is apparently a burrowing species preferring habitats with sparse plant cover and fine textured sedimentary soils. Males were encountered significantly more often than females, females being conspicuously rare in the samples taken. Juveniles were also conspicuously lacking in the samples taken on the ground surface at night. All specimens were collected on the soil surface at night using the ultraviolet detection method.

Vejovis schwenkmeyeri Williams, new species.
(Figures 16, 17.)

Diagnosis. Medium sized species of *Vejovis*. Body base color pale yellow; completely lacking stripes and other distinctive markings except for underlying dusky markings on carapace—this most prominent in juveniles and almost obsolete in adults. Pedipalp hands with keels smooth to obsolete; males with open proximal scallop when chela closed; movable finger approximates carapace in length. Metasoma with inferior median keels smooth to obsolete on segments I to III and smooth on segment IV; inferior lateral keels smooth to subtly crenulate on segments I to III, and crenulate on segment IV. Pectines with 14 to 17 (predominantly 15) teeth on females, and 17 to 19 teeth on males. Inferior border of movable cheliceral finger completely lacking denticles.

Appears related to *Vejovis confusus* Stahnke, from which it differs in the following characters: *V. confusus* lacks the large proximal open scallop on pedipalp chela of adult males; teeth of pedipalp chela extend to proximal border of both fingers in *V. confusus*; *V. confusus* tends to have slightly smaller body size.

Description of holotype (male). *Coloration*: carapace, mesosoma, metasoma, and pedipalps of uniform pale yellow; walking legs similar but lighter than pedipalps; pectines white. Only contrasting color markings are: eyes black, teeth of chelicerae and fingers of pedipalps reddish, aculeus dark reddish brown. Cuticle otherwise unpigmented.

Carapace: Anterior margin essentially straight but with subtle median emargination, set with six erect bristles. Lateral eyes three per group, anterior eye in each group largest. Median eye diad slightly more than ⅕ carapace width at that point. Carapace surface densely covered with large conspicuous granules.

Mesosoma: All dorsal plates densely covered by large granules; segment 7 with two pairs of lateral keels with large dentate granules. Sternites smooth and lustrous; one pair of crenulate keels on last sternite. Stigma small and long oval.

Metasoma: All dorsal and dorsolateral keels complete and with large granules giving serrate appearance, except that the dorsals absent on segment V. Lateral keels present and serrate on posterior ⅚ of segment I, and posterior ⅙ of segments II and III, absent on IV, present and crenulate on anterior half of V. Inferior lateral keels present on all segments; smooth to subtly crenulate on I, II and III; crenulate on IV; serrate on V. Inferior median keels smooth to obsolete on I to III; smooth on IV; serrate on V. Inferior median keels set with 3, 3, 3, 4 pairs of bristles on segments I to IV respectively. Inferior intercarinal space of V densely covered with conspicuous granules.

Telson: Ventral side lacking conspicuous long hairs, but with numerous, short, inconspicuous, whitish hairs apparent under higher magnification. Ventral side of vesicle densely covered with conspicuous granules; subaculear tubercule present.

Pectines: Long and thick; triangular fulcra; 18/19 pectinal teeth. Inferior surface with short, red hair, especially dense on fulcra, middle lamallae and anterior margin.

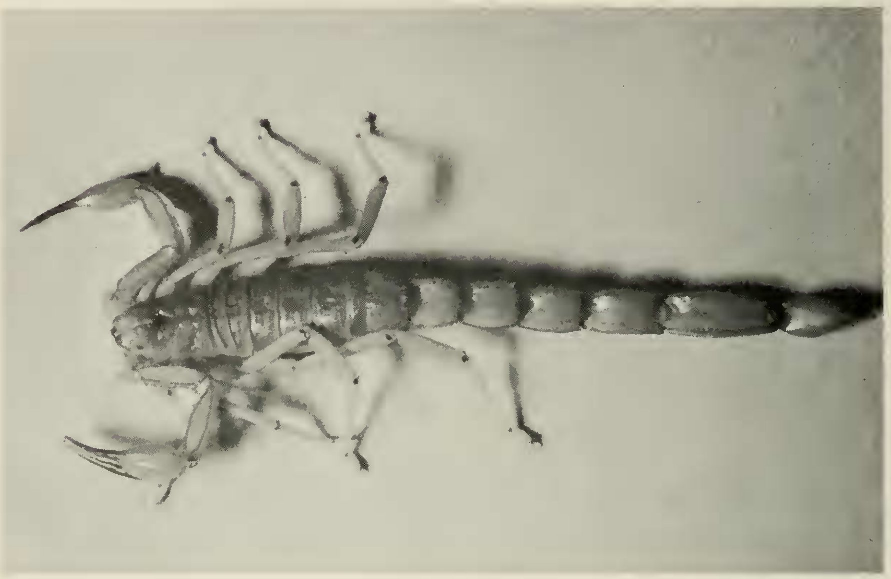

FIGURE 16. *Vejovis schwenkmeyeri*, new species. Dorsal view of holotype.

Genital operculum: Completely divided longitudinally; large distinct genital papillae visible externally.

Chelicerae: Inferior border of movable finger completely lacking denticles; terminal tooth of superior border of movable finger much shorter than terminal tooth of inferior border.

Pedipalps: Palm of hand only slightly swollen, all keels smooth to obsolete. Fixed finger distinctly shorter than carapace, movable finger same length as carapace. Internal margin of fingers with large proximal scallop in which opposing teeth do not meet when fingers closed; teeth do not extend to proximal end of either finger.

Standard measurements and photographs: Table 6 and figures 16 and 17.

DESCRIPTION OF ALLOTYPE (female). Morphologically the same as holotype with the following exceptions: body heavier, carapace and mesosoma broader; chela slightly longer but not as wide; pectine teeth fewer (15/15 instead of 18/19); pectines smaller in overall size; no genital papillae; chela with no large proximal scallop when fingers closed; genital operculum not completely divided longitudinally; ventral side of vesicle with numerous long reddish conspicuous hairs; frontal margin of carapace without distinct median emargination; inferior metasomal keels not as heavily developed.

Standard measurerments: Table 6.

VARIATION WITHIN PARATYPES. Study of 153 paratopotypes (75 males, 78 females) indicated little variation from the description of holotype and allotype.

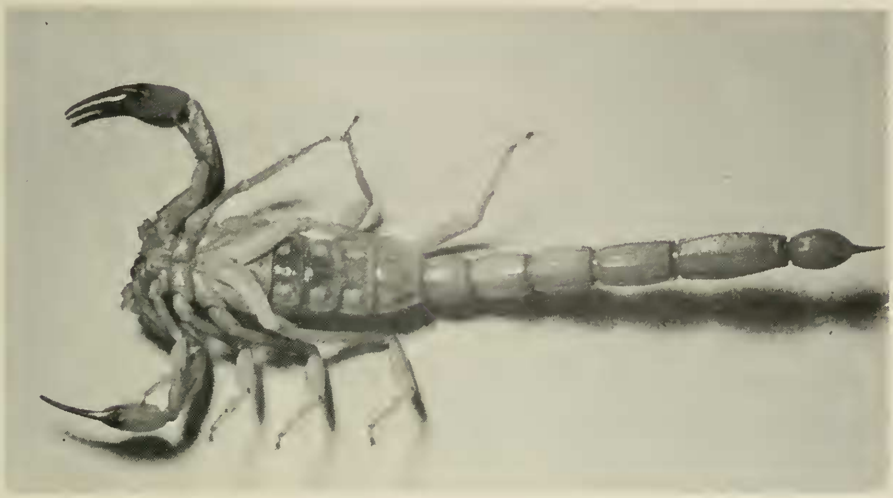

Figure 17. *Vejovis schwenkmeyeri,* new species. Ventral view of holotype.

Males varied in total length from 25 to 54 millimeters while females varied from 27 to 56 millimeters. Most specimens appeared to be mature, but young instars of both sexes were present. Little sexual dimorphism occurred with the following exceptions: females with slightly wider mesosoma and heavier body in adults; male pectines tended to have longer and more numerous teeth; genital papillae present in males; genital operculum of males completely divided longitudinally; vesicle of female conspicuously more hirsute than that of male; adult males with proximal open scallop on pedipalp chela. Young instars looked similar to adults except that the cuticle was lighter yellow and had dusky underlying marking on the dorsum. Dusky markings of juveniles was generally very distinct but variable among individuals. Pectine teeth varied from 14 to 17 in females (predominantly 15) and 17 to 19 in males (predominantly 18 and 19).

Type data and etymology. The holotype, allotype, and 153 paratopotypes were collected at Bahía de Los Angeles, Baja California Norte, 19 June 1968 by S. C. Williams, M. A. Cazier, and party. The holotype and allotype are permanently deposited in the California Academy of Sciences.

This species is named "*schwenkmeyeri*" in honor of Richard C. Schwenkmeyer who has encouraged many students to pursue studies in field biology and who has also made it possible for many students to travel to various inaccessible regions of the Baja California Peninsula.

Material. In addition to the holotype, allotype, and 153 paratopotypes, an additional 490 specimens were studied. These came from the following locations in Baja California Norte, Mexico: Puertecitos and for 2 miles south, 10 June 1968 (S. C. Williams, M. A. Cazier, and party), 5 males, 2 females;

Table 6. *Measurements (in millimeters) of* Vejovis schwenkmeyeri, *new species, holotype and allotype.*

	Holotype (male)	Allotype (female)
Total length	52.7	54.3
Carapace, length	5.8	6.8
width (at median eyes)	4.2	5.0
Mesosoma, length	13.8	14.9
Metasoma, length	25.9	24.9
segment I (length/width)	3.6/3.5	3.4/3.8
segment II (length/width)	4.3/3.4	4.0/3.8
segment III (length/width)	4.5/3.3	4.2/3.6
segment IV (length/width)	5.8/3.2	5.5/3.5
segment V (length/width)	7.7/3.2	7.8/3.3
Telson, length	7.2	7.7
Vesicle (length/width)	5.0/2.9	5.4/3.3
depth	2.4	2.6
Aculeus, length	2.2	2.3
Pedipalp		
Humerus (length/width)	5.5/1.5	5.7/1.8
Brachium (length/width)	5.9/1.9	6.4/2.1
Chela (length/width)	9.1/2.3	9.4/2.0
depth	2.6	2.1
movable finger, length	5.8	6.3
fixed finger, length	4.5	5.0
Pectines		
teeth (left/right)	18/19	15/15

Puertecitos, 10 June 1968 (M. A. Cazier, J. Davidson, and N. Leppla), 2 males, 1 female; Puertecitos, elevation 50 feet, 11 June 1968 (S. C. Williams, M. A. Cazier, and party), 2 males, 2 females; Oakies Landing, 12 June 1968 (S. C. Williams, M. A. Cazier, and party), 45 males, 1 female; 8 miles north of Bahía de San Luis Gonzaga, 13 June 1968 (S. C. Williams, M. A. Cazier, and party), 17 males, 19 females; 6 miles north of Bahía de San Luis Gonzaga, 13 June 1968 (S. C. Williams, M. A. Cazier, and party), 17 males, 19 females; 10 miles north of Bahía de San Luis Gonzaga, 13 June 1968 (S. C. Williams, M. A. Cazier, and party), 10 males, 5 females; 1 mile north of Bahía de San Luis Gonzaga, 14 June 1968 (S. C. Williams, M. A. Cazier, and party), 13 males, 5 females; 6 miles north of Bahía de San Luis Gonzaga, 14 June 1968 (S. C. Williams, M. A. Cazier, and party), 30 males, 26 females; 7 miles north of Bahía de San Luis Gonzaga, 14 June 1968 (S. C. Williams, M. A. Cazier, and party), 20 males, 15 females; Calamajue Arroyo, elevation 1000 feet, 15 June 1968 (S. C. Williams, M. A. Cazier, and party), 11 males, 3 females; Calamajue

Arroyo, elevation 1000 feet, 16 June 1968 (S. C. Williams, M. A. Cazier, and party), 7 males, 2 females; Mission San Borjas, elevation 1500 feet, 20 June 1968 (S. C. Williams, M. A. Cazier, and party), 25 males, 12 females; 2 miles northwest of Miller's Landing, elevation sea level, 21 June 1968 (S. C. Williams, M. A. Cazier, and party), 8 males, 3 females; 3 miles north of Manuela, elevation 500 feet, 22 June 1968 (S. C. Williams, M. A. Cazier, and party), 13 males, 6 females. The following specimens came from Baja California Sur, Mexico: 3 miles southeast of Rancho Tablon, 23 June 1968 (S. C. Williams, M. A. Cazier, and party), 21 males, 11 females; San Ignacio, elevation 500 feet, 24 June 1968 (S. C. Williams, M. A. Cazier, and party), 3 males, 2 females; San Ignacio, elevation 500 feet, 25 June 1968 (S. C. Williams, M. A. Cazier, and party), 1 male, 2 females; San Ignacio, elevation 500 feet, 26 June 1968 (S. C. Williams, M. A. Cazier, and party), 9 males, 2 females; San Angel, 27 June 1968 (S. C. Williams, M. A. Cazier, and party), 7 males, 5 females; San Angel, 28 June 1968 (S. C. Williams, M. A. Cazier, and party), 10 males, 15 females; 35 miles south of San Angel, elevation 50 feet, 29 June 1968 (S. C. Williams, M. A. Cazier, and party), 1 male; 8 miles northwest of San Raymundo, elevation 500 feet, 30 June 1968 (S. C. Williams, M. A. Cazier, and party), 54 males, 24 females; 4 miles west of La Purisima, elevation 375 feet, 1 July 1968 (S. C. Williams, M. A. Cazier, and party), 4 males, 5 females.

Comment. This is a relatively widely distributed species, occurring from Puertecitos in Baja California Norte to La Purisima in Baja California Sur. It occurs on the Gulf coast, the coast of the Pacific, and in inland habitats where rocky and sandy habitats occur together (fig. 18). It was a numerically abundant species in a number of the habitats sampled, but was rare in a number of habitats as well. Juveniles were conspicuously rare in most of the samples. Specimens collected in the northern part of the range (Puertecitos to Bahía de San Luis Gonzaga) were distinct from typical specimens in that the telson of the adult male had a relatively hirsute appearance and both sexes had dusky markings on the dorsum more distinct. In a few other localities the dusky dorsal markings were more variable also, but this always faint and indistinct. All specimens were collected by means of ultraviolet detection.

Vejovis diazi Williams, new species.

(Figures 19, 20.)

Diagnosis. Medium-sized species of *Vejovis.* Base body color uniform pale yellow; carapace and mesosoma dorsum may or may not have evident underlying dusky markings; mature individuals of both sexes with contrasting reddish telson and pedipalp fingers. Pedipalp palms moderately swollen and with keels obsolete; movable finger distinctly shorter than carapace. Inferior lateral keels of metasoma basically smooth to crenulate on segments I to IV; inferior median keels obsolete on segments I to IV. Inferior border of movable

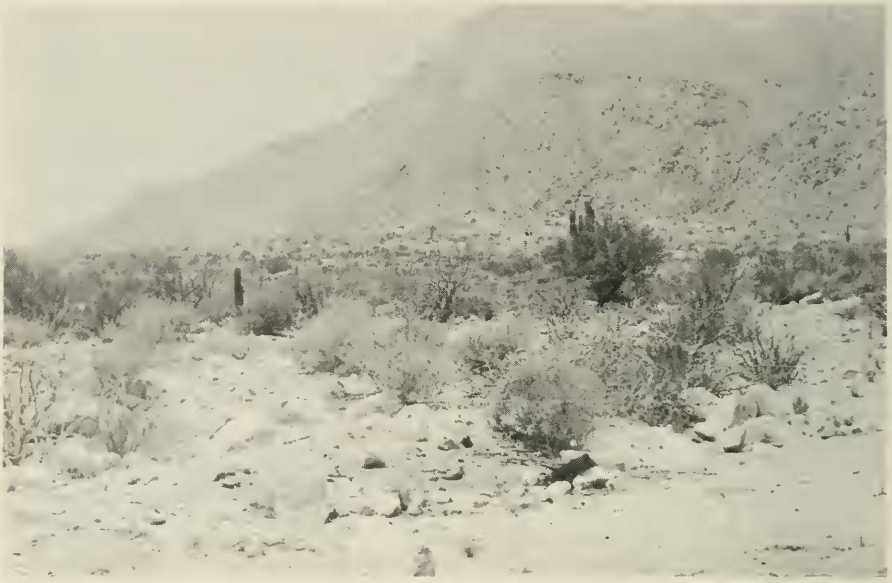

FIGURE 18. Type locality and habitat of *Vejovis schwenkmeyeri,* Bahía de Los Angeles, Baja California Norte, Mexico, 19 June 1968.

cheliceral finger completely smooth and lacking denticles. Pectinal teeth vary from 14 to 16 in females and from 17 to 20 in males.

Related to *Vejovis eusthenura* (Wood) from which it differs in the following characteristics: adults with more reddish pedipalp fingers and more reddish telson; hand of adults more swollen; three pairs of bristles on frontal margin of carapace (five pairs in *V. eusthenura*); vesicle with fewer basal granules; base color of cuticle slightly more reddish; closed pedipalp chela with distinctly larger proximal open space.

DESCRIPTION OF HOLOTYPE (male). *Coloration*: Carapace, mesosoma, metasoma, and pedipalps of uniform pale yellow; walking legs similar but lighter than pedipalps; pectines almost white. Carapace with faint, dusky, underlying markings. Only contrasting color markings are: eyes black, teeth of chelicerae reddish orange, fingers of pedipalps light amber, entire vesicle reddish orange, aculeus black, tips of pretarsal claws reddish orange. Cuticle almost transparent. Regions of walking legs with faint dusky markings.

Carapace: Anterior margin straight, with six erect red bristles. Lateral eyes three per group, most anterior eye in each group largest. One large, erect bristle lateral to posterior margin of each median eye; diad slightly less than ¼ carapace width at that point. Carapace covered with large granules and slightly lustrous.

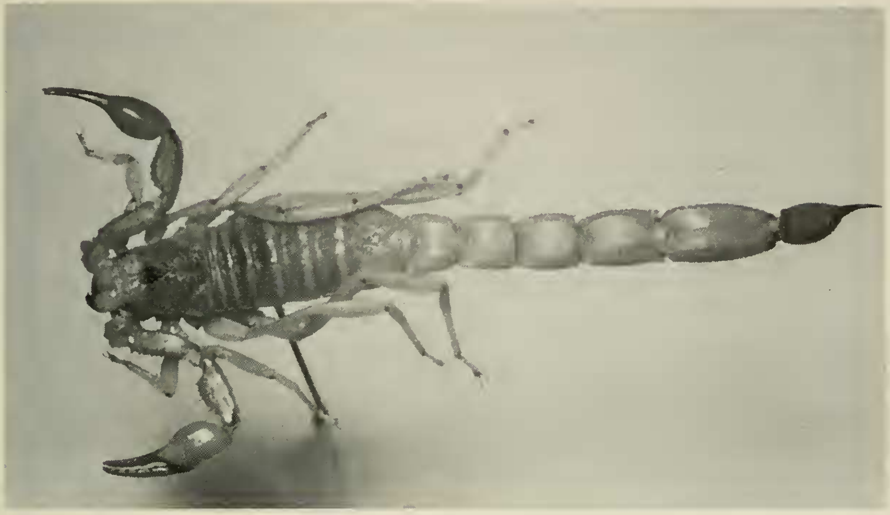

Figure 19. *Vejovis diazi,* new species. Dorsal view of holotype.

Mesosoma: All dorsal plates densely covered by large granules; segment 7 with two pairs of lateral keels with large dentate granules; lateral margin of segment 7 abruptly flattened horizontally and with dentate granules. Sternites smooth and lustrous; one pair of keels on last sternite smooth to crenulate. Stigma long oval.

Metasoma: All dorsal and dorsolateral keels serrate. Lateral keels present and serrate on posterior ⅚ of segment I, posterior ⅓ of II, posterior ¼ of III, absent on IV, present and serrate to crenulate on anterior ½ of V. Inferior lateral keels present and complete on all segments; segments I to III smooth to crenulate; IV crenulate to serrate; V serrate. Inferior median keels obsolete on I to IV, serrate on segment V. Area of inferior median keels with three pairs of reddish bristles on segments I to IV. Inferior median keel of segment V with regularly spaced serrate granules. Intercarinal spaces with abundant, moderately sized granules.

Telson: Ventral side densely covered by long reddish hairs that approach aculeus in length. Vesicle smooth and lustrous and lacking subaculear tubercule.

Pectines: Long and thick; large subcircular to triangular fulcra; 19/19 pectinal teeth. Inferior surface with short, red hair, especially dense on fulcra, middle lamellae and anterior margin.

Genital operculum: Completely divided longitudinally; large genital papillae visible externally.

Chelicerae: Inferior border of movable finger completely lacking denticles; terminal tooth of superior border of movable finger subequal to terminal tooth of inferior border.

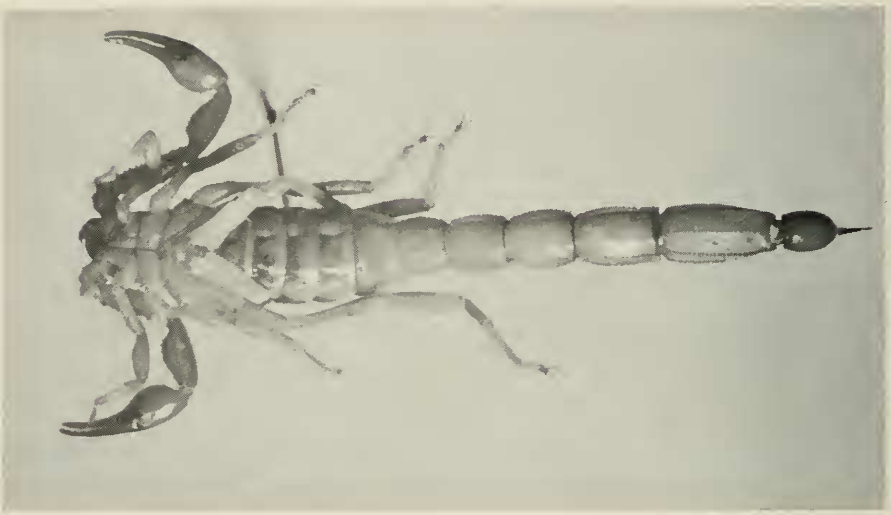

Figure 20. *Vejovis diazi,* new species. Ventral view of holotype.

Pedipalps: Palm moderately swollen, all keels obsolete. Fixed finger and movable finger each shorter than carapace. Internal margin of fingers faintly scalloped; teeth do not extend to proximal end of fingers. Proximal teeth do not meet in last scallop when chela closed.

Standard measurements and photographs: Table 7 and figures 19 and 20.

Description of allotype (female). Morphologically the same as holotype with the following exceptions: slightly smaller in total length; slightly smaller in carapace width; larger in mesosomal length and smaller in metasomal length; chela slightly shorter and narrower; pectine with about 25 percent fewer teeth (14/13 instead of 19/19); dusky markings of carapace faintly detectable; carapace and tergites not as granular; carapace and tergites more lustrous; pectines smaller, no genital papillae, genital operculum not completely divided longitudinally; vesicle not as dark reddish orange; lacking basal scallop of pedipalp fingers.

Standard measurements: Table 7.

Variation within paratypes. Study of 19 paratopotypes (10 males, 9 females) indicated little significant variation from the descriptions of holotype and allotype. Males varied in total body length from 29 to 48 millimeters while females varied from 23 to 43 millimeters. The sample contained both adult and subadult instars but younger instars were totally lacking. Little sexual dimorphism occurred except for structure of pectines, presence of genital papillae in males, complete division of genital operculum in males, and large proximal open space in mature male pedipalp chela. Subadults were similar to adults

Table 7. *Measurements (in millimeters) of* Vejovis diazi, *new species, holotype and allotype.*

	Holotype (male)	Allotype (female)
Total length	42.5	41.6
Carapace, length	5.2	5.0
width (at median eyes)	3.8	3.6
Mesosoma, length	10.5	13.8
Metasoma, length	20.6	17.3
segment I (length/width)	3.0/3.2	2.4/3.0
segment II (length/width)	3.3/3.2	2.7/2.9
segment III (length/width)	3.4/3.2	2.9/2.8
segment IV (length/width)	4.6/3.2	3.7/2.8
segment V (length/width)	6.3/3.2	5.6/2.8
Telson, length	6.2	5.5
Vesicle (length/width)	4.2/2.3	3.8/2.2
depth	1.9	1.8
Aculeus, length	2.0	1.7
Pedipalp		
Humerus (length/width)	4.2/1.4	3.8/1.4
Brachium (length/width)	4.8/1.8	4.3/1.6
Chela (length/width)	7.3/2.0	6.6/1.7
depth	2.2	1.9
movable finger, length	4.5	4.0
fixed finger, length	3.3	3.2
Pectines		
teeth (left/right)	19/19	14/13

except that young males lacked open space on pedipalp chela. Most subadults of both sexes showed some very faint dusky pigmentation lateral to ocular tubercule—this was not apparent in adults. Adults of both sexes had pedipalp fingers and vesicle reddish brown, subadults by contrast did not. Pectine teeth varied from 14 to 16 (predominantly 15) in females and from 17 to 20 (predominantly 19 and 20) in males.

Type data and etymology. The holotype, allotype, and 19 paratopotypes were collected 21.4 miles west of El Crucero, elevation 75 feet, 26 July 1968, by S. C. Williams, M. A. Cazier, and party.

The holotype and allotype are permanently deposited in the California Academy of Sciences.

This species is named "*diazi*" in honor of A. Diaz Najera of the Instituto de Salubridad y Enfermedades Tropicales of Mexico, because of his significant contributions to the knowledge of the North American scorpion fauna.

Material. In addition to the holotype, allotype, and 19 paratopotypes, 1394 (568 males, 826 females) other specimens were studied. These specimens were from the following localities in Baja California Sur, Mexico: San Ignacio, elevation 500 feet, 25 June 1968 (S. C. Williams, M. A. Cazier, and party), 3 males, 5 females; San Ignacio, elevation 500 feet, 26 June 1968 (S. C. Williams, M. A. Cazier, and party), 5 females; 35 miles south of San Angel, elevation 50 feet, 29 June 1968 (S. C. Williams, M. A. Cazier, and party), 5 males, 4 females; 8 miles northwest of San Raymundo, elevation 500 feet, 30 June 1968 (S. C. Williams, M. A. Cazier, and party), 12 males, 22 females; 8 miles northwest of San Raymundo, elevation 500 feet, 30 June 1968 (S. C. Williams, M. A. Cazier, and party), 76 males, 28 females; 4 miles west of La Purisima, elevation 1375 feet, 1 July 1968 (S. C. Williams, M. A. Cazier, and party), 29 males, 23 females; 5 to 10 miles southwest of San Miguel de Comondu, 3 July 1968 (S. C. Williams, M. A. Cazier, and party), 16 males, 22 females; 75 miles northwest of La Paz, elevation 200 feet, 4 July 1968 (S. C. Williams, M. A. Cazier, and party), 20 males, 16 females; 5 to 6 miles southwest of La Paz, elevation 25 feet, 5 July 1968 (S. C. Williams, M. A. Cazier, and party), 5 males, 6 females; La Paz, elevation 25 feet, 5 July 1968 (S. C. Williams, M. A. Cazier, and party), 2 males, 8 females; 5 to 10 miles west of La Paz, elevation 25 feet, 6 July 1968 (S. C. Williams, M. A. Cazier, and party), 10 males, 12 females; 5 to 6 miles southwest of La Paz, elevation 25 feet, 6 July 1968 (S. C. Williams, M. A. Cazier, and party), 7 males, 9 females; 1 mile south of La Paz, elevation 100 feet, 6 July 1968 (S. C. Williams, M. A. Cazier, and party), 28 males, 39 females; Isla Espiritu Santo, 7 July 1968 (S. C. Williams, M. Bentzien, and W. Fox), 23 males, 56 females; Isla Partida, 9 July 1968 (S. C. Williams, M. Bentzien, and W. Fox), 15 males, 31 females; 1 mile east of Los Aripes, 8 July 1968 (M. A. Cazier, J. Bigelow, and N. Leppla), 7 males, 12 females; 14 miles northeast of La Paz, 9 July 1968 (M. A. Cazier, J. Bigelow, and N. Leppla), 23 males, 39 females; 14 miles northeast of La Paz, 10 July 1968 (M. A. Cazier, J. Bigelow, and N. Leppla), 11 males, 20 females; ¼ mile north of La Paz airport, 12 July 1968 (M. A. Cazier and J. Bigelow), 11 males, 27 females; ¼ mile north of La Paz airport, 13 July 1968 (S. C. Williams, M. A. Cazier, and party), 42 males, 72 females; ¼ mile north of La Paz airport, 13 July 1968 (S. C. Williams, M. A. Cazier, and party), 1 male, 1 female; 14 miles northeast of La Paz, 14 July 1968 (S. C. Williams, J. Bigelow, W. Fox, and J. Davidson), 3 males, 3 females; 7 miles west of El Triunfo, elevation 1800 feet, 24 July 1968 (S. C. Williams and M. Bentzien), 2 males, 2 females; 9.6 miles west of Los Aripes, elevation 400 feet, 25 July 1968 (S. C. Williams, M. Bentzien, and J. Bigelow), 50 males, 90 females; 11.9 miles west of Los Aripes, elevation 800 feet, 25 July 1968 (S. C. Williams, M. Bentzien, and J. Bigelow), 5 males, 11 females; 21.4 miles west of Los Aripes, elevation 900 feet, 25 July 1968 (S. C. Williams, M. Bentzien, and J. Bigelow), 7 males, 11 females; 31.0 miles west of Los Aripes, elevation 800 feet, 25 July 1968 (S. C. Williams, M. Bentzien, and J. Bigelow), 3 males, 4 females; La Paz, 25 July 1968 (M. A. Cazier), 2 females; 28.9 miles west of El Crucero, 26 July 1968 (S. C. Williams, M. A. Cazier, and party), 1 male, 2 females; 26.8 miles west of El Crucero, 26 July 1968 (S. C. Williams, M. A. Cazier, and party), 7 males, 10 females; 10.5 miles west of El Crucero, 26 July 1968 (S. C. Williams, M. A. Cazier, and party), 1 male, 1 female; Santa Rita, 27 July 1968 (S. C. Williams, M. Bentzien, and J. Bigelow), 3 males, 2 females; 10.3 miles southeast Santa Rita, 27 July 1968 (S. C. Williams, M. Bentzien, and J. Bigelow), 11 males, 17 females; 27.3 miles southeast of Santa Rita, 27 July 1968 (S. C. Williams, M. Bentzien, and J. Bigelow), 2 males, 5 females; 35.3 miles northwest of Los Aripes, 27 July 1968 (S. C. Williams, M. Bentzien, and J. Bigelow), 9 males, 13 females; 35.3 miles northwest of Los Aripes, 27 July 1968 (S. C. Williams, M. Bentzien, and J. Bigelow), 1 male; Las Cruces, 29 July 1968 (S. C. Williams, M. A. Cazier, and party), 38 males, 72 females; Las Cruces and southwest for 5 miles, 30 July 1968 (S. C. Williams, M. A. Cazier, and party), 79 males, 121 females; 5 miles southwest of La Paz, elevation 25 feet, 31 July 1968 (S. C. Williams and M. Bentzien), 1 male, 2 females.

Comment. In the type locality on the Magdalena Plain, this species lived in relatively flat, rock-free terrain (fig. 15). The soils here were fine textured, moderately packed sediment. The vegetation was of a xeric type with many cacti and ocotillos. The ocotillos were often densely covered by hanging lichen. In other parts of the geographic range, this species also was found in predominantly rocky, volcanic habitats in regions where loosely packed soils had accumulated. Three morphological characteristics tended to vary over the geographic range: telson hirsuteness, body size, and emphasis of underlying dark pigment on the carapace and mesosomal dorsum. In some habitats, this pigment was greatly emphasized, especially in younger instars, while in other habitats this pigment formation was obsolescent and barely detectable. Females were significantly more abundant than males in most of the samples. All specimens were collected by ultraviolet detection.

Vejovis hoffmanni Williams, new species.

(Figures 21, 22.)

Diagnosis. Medium sized species of *Vejovis* with mature females attaining slightly larger body sizes than mature males. Body base color pale golden yellow; with underlying faint dusky markings on carapace near ocular tubercule. Inferior lateral keels of metasoma smooth to crenulate (basically smooth) on segments I to IV; inferior median keels absent or obsolete on segments I to IV. Pectines with 15 to 18 teeth in females, 18 to 21 teeth in males. Carapace slightly longer than movable pedipalp finger; palm of chela not greatly swollen, lacks keels and agranulate. Inferior border of movable cheliceral finger completely lacking denticles.

Related to *Vejovis schwenkmeyeri* from which it differs in the following characteristics: metasoma with inferior median keels absent or obsolete, inferior lateral keels more smooth; pedipalp fingers of adults not reddish; smaller body size; slightly stouter metasomal segments; adult males and females do not differ in vesicle hirsuteness.

DESCRIPTION OF HOLOTYPE (male). *Coloration*: Carapace, mesosoma, metasoma, pedipalps, and walking legs uniform, pale golden yellow; underlying faint dusky markings on carapace later and posterior to ocular tubercule; pectines whitish; eyes black; aculeus reddish brown; dusky marking in places on legs.

Carapace: Anterior margin straight, no emargination, set with three pairs of erect brown bristles. Lateral eyes three per group, anterior two largest in each group; median diad ¼ carapace width at that point; one pair of long brownish hairs on ocular tubercule posterior to diad. Carapace densely covered with granules.

Mesosoma: Terga densely granular; segment 7 with two pairs of lateral keels and one median keel, these irregularly dentate. Sterna smooth, lustrous and agranulate; sternite 7 with one pair of finely crenulate keels; stigma long oval.

Metasoma: All dorsal and dorsolateral keels serrate except that dorsal keels of segment V absent, dorsal keels of segments I to II each terminate posteriorly in a slightly enlarged spine; lateral keels irregularly serrate on posterior ⅚ segment I, posterior ⅓ of II, posterior ⅙ of III, absent on IV, crenulate on anterior ½ of V; inferior lateral keels smooth to crenulate on segments I to IV, serrate on V; inferior median keels obsolete on segments I to IV, serrate on V. Inferior intercarinal space of segment V densely granular.

Telson: Vesicle appears very hirsute; ventral surface of vesicle with about 20 pairs of long conspicuous reddish hairs; ventral surface of vesicle basically smooth and lustrous, but with numerous low, rounded, obsolete granules; subaculear tubercule subtle.

Pectines: Long and thick; 19 long pectinal teeth; triangular to subcircular middle lamellae.

Gential operculum: Completely divided longitudinally; genital papillae visible externally.

Chelicerae: Inferior border of movable finger completely lacking denticles; terminal tooth of inferior border and terminal tooth of superior border of movable finger subequal, superior tooth being shorter.

Pedipalps: Palms only slightly swollen; keels absent, surface of palm smooth, agranulate and lustrous. Fixed finger and movable finger each shorter than carapace; fingers elongate, fixed finger slightly longer than palm. Grasping edge of fingers with only one slight scallop, this along proximal ⅕ of fixed finger; opposing fingers touch only at distal end when chela closed; teeth do not extend to proximal ends of fingers.

Standard measurements and photographs: Table 8 and figures 21 and 22.

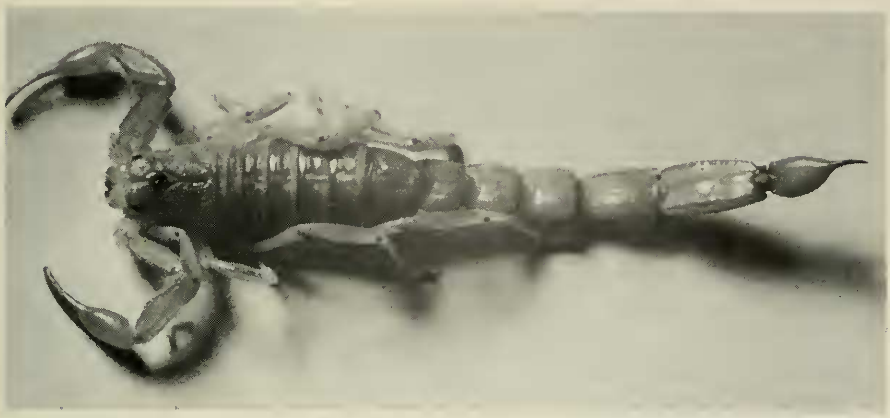

Figure 21. *Vejovis hoffmanni,* new species. Dorsal view of holotype.

Description of allotype (female). Essentially the same as holotype in color and structure with the following exceptions: slightly larger in most body dimensions; dusky markings on carapace reduced; slightly fewer pectinal teeth (16/17 instead of 19/19); genital papillae absent; genital operculum not completely divided longitudinally; scallop on fixed finger of chela not well developed; pectines smaller and with considerably shorter teeth; carapace and tergites not as granular and with more lustrous appearance.

Standard measurements: Table 8.

Variation within paratypes. Study of 137 paratopotypes (74 males, 63 females) indicated little variation from the description of holotype and allotype. Males varied in length from 13 to 35 millimeters while females varied from 18

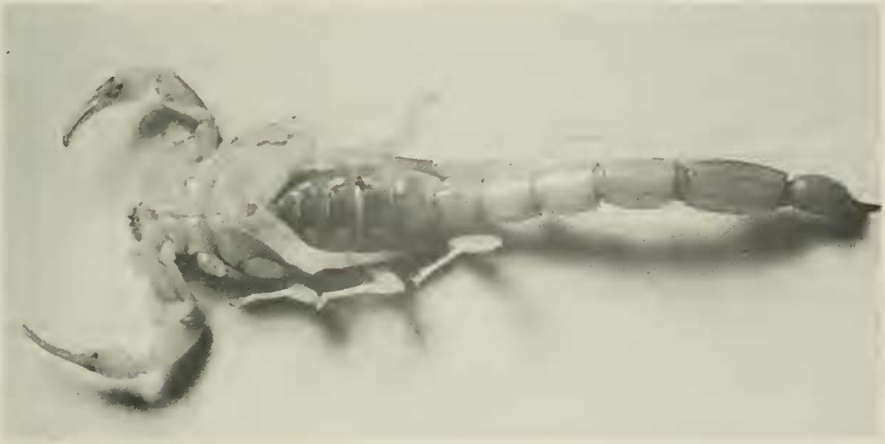

Figure 22. *Vejovis hoffmanni,* new species. Ventral view of holotype.

Table 8. *Measurements (in millimeters) of* Vejovis hoffmanni, *new species, holotype and allotype.*

	Holotype (male)	Allotype (female)
Total length	33.5	36.5
Carapace, length	4.0	4.8
width (at median eyes)	3.0	3.6
Mesosoma, length	8.8	10.2
Metasoma, length	16.0	16.1
segment I (length/width)	2.2/2.4	2.2/2.7
segment II (length/width)	2.5/2.3	2.5/2.6
segment III (length/width)	2.7/2.3	2.7/2.5
segment IV (length/width)	3.6/2.3	3.5/2.5
segment V (length/width)	5.0/2.4	5.2/2.6
Telson, length	4.7	5.4
Vesicle (length/width)	3.1/1.8	3.4/2.2
depth	1.4	1.8
Aculeus, length	1.6	2.0
Pedipalp		
Humerus (length/width)	3.4/1.1	3.6/1.2
Brachium (length/width)	3.7/1.4	4.0/1.6
Chela (length/width)	5.6/1.3	6.3/1.5
depth	1.4	1.6
movable finger, length	3.7	4.1
fixed finger, length	2.9	3.1
Pectines		
teeth (left/right)	19/19	16/17

to 40 millimeters. The specimens were variable in size and ranged from about third instars to sexually mature adults. Mature females reached longer body lengths and had a slightly heavier mesosoma. A definite tendency toward obsolescence of the inferior median keels of the metasoma was apparent. The main sexual dimorphisms were: pectines smaller and with fewer teeth in the female; males with genital papillae; males with genital operculum completely divided longitudinally; adult males with open scallop on pedipalp chela. Both sexes were similar in coloration and other body proportions. Young instars were similiar to adults in color and structure, but smaller in size. Pectine teeth varied from 15 to 18 (predominantly 16 and 17) in females and from 18 to 21 (predominantly 19 and 20) in males.

Type data and etymology. The holotype, allotype, and 137 paratopotypes were collected 3 miles north of Manuela, elevation 500 feet, Baja California Norte, Mexico, 22 June 1968 by S. C. Williams, M. A. Cazier, and party. The holotype and allotype are permanently deposited in the California Academy of Sciences.

This species is named "*hoffmanni*" in honor of the late Carlos C. Hoffmann who devoted many years to studying the scorpion fauna of mainland Mexico. His systematic monograph on the scorpions of Mexico has been an outstanding and very useful contribution to the knowledge of North American scorpions.

Material. In addition to the holotype, allotype, and 137 partopotypes, 304 (161 males, 143 females) paratypes were studied from four other localities. These specimens came from the following places in Baja California Norte, Mexico: 2 miles northwest of Miller's Landing, elevation 25 feet, 21 June 1968 (S. C. Williams, M. A. Cazier, and party), 54 males, 35 females. The remainder of these specimens came from the following localities in Baja California Sur, Mexico: 3 miles southeast of Rancho Tablon, 23 June 1968 (S. C. Williams, M. A. Cazier, and party), 28 males, 26 females; San Ignacio, elevation 500 feet, 24 June 1968 (S. C. Williams, M. A. Cazier, and party), 6 males; San Ignacio, elevation 500 feet, 26 June 1968 (S. C. Williams, M. A. Cazier, and party), 17 males, 13 females; San Angel, elevation 500 feet, 27 June 1968 (S. C. Williams, M. A. Cazier, and party), 14 males, 12 females, San Angel, elevation 500 feet, 28 June 1968 (S. C. Williams, M. A. Cazier, and party), 42 males, 57 females.

Comment. This species was found predominantly in moderately packed sedimentary soils along the western side of the Baja peninsula from San Ignacio to near La Purisima. It often occurred in habitats completely lacking surface rocks or other surface cover, and appears to be a burrowing species (fig. 23). It has the tendency to form local color races in accord with the predominant substrate. This was most conspicuous around the San Angel sand dunes where the cuticle had a lighter base color and the dusky carapace pigment was very faint. At San Ignacio this species had a cuticle with a darker base color and more prominent dusky pigmentation on the dorsum. All specimens were collected by means of ultraviolet detection.

Vejovis bruneus Williams, new species.

(Figures 24, 25.)

Diagnosis. Medium-sized species of *Vejovis* with mature females attaining larger body proportion than mature males. Body base color uniform light brown; pedipalps with contrasting reddish brown fingers; pedipalp hands with greatly swollen palm; palm with well developed and granulate keels; movable finger distinctly shorter than carapace; internal border of fingers not scalloped and no distinct open space when chela closed. Inferior lateral and inferior median keels of metasoma distinctly developed and very finely crenulate to finely serrate. Vesicle of both sexes with a number of fine, inconspicuous hairs. Chelicerae with inferior border of movable finger completely lacking denticles.

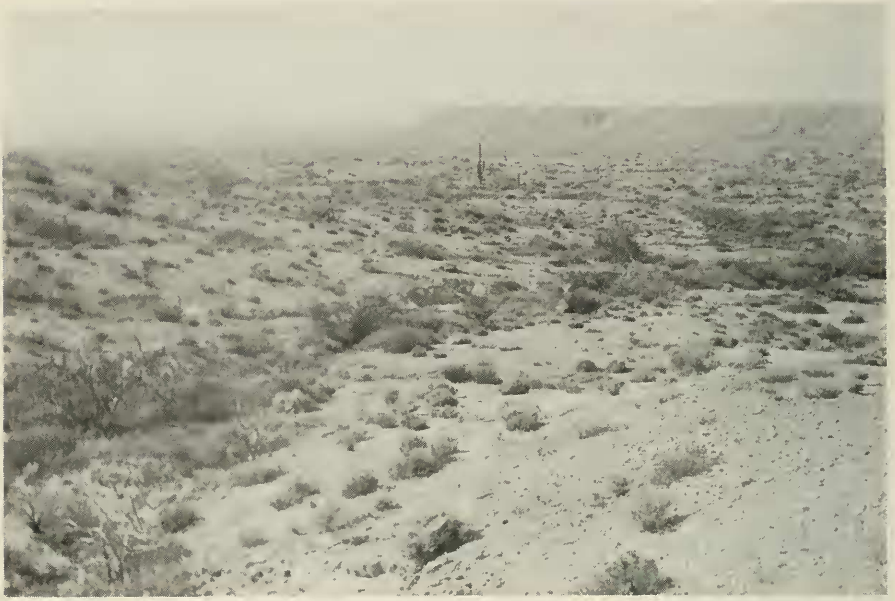

Figure 23. Habitat of *Vejovis hoffmanni*, on plateau overlooking San Juan Arroyo, 8 miles northwest of San Raymundo, Baja California Sur, Mexico, 30 June 1968.

Related to *Vejovis punctipalpus* (Wood) and *Vejovis insularis* Williams. Differs from *V. punctipalpus* in that neither sex with scalloped pedipalp fingers or open space when chela closed; no distinct sexual dimorphism of pedipalp hand; *V. bruneus* has telson with emphasized aculeus but this not as distinctly so as with *V. punctipalpus*; cuticle and pedipalp fingers more brownish. *Vejovis bruneus* differs from *Vejovis insularis* in the following ways: vesicle of male and female not densely covered with long robust hairs; mature female without scalloped pedipalp fingers; telson without vesicle so greatly reduced and aculeus so greatly elongate.

Description of holotype (male). *Coloration*: Carapace, mesosoma, metasoma, and pedipalps of uniform light brown; walking legs similar but lighter than pedipalps; pectines white. Only contrasting color markings are: eyes black, fingers of pedipalps dark reddish brown, aculeus dark brown; various cuticular keels darker than surrounding cuticle.

Carapace: Anterior border with distinct, broad median emargination producing rounded frontal lobes, this border set with six short erect bristles. Lateral eyes three per group, most anterior eye in each group largest. Median eye diad ⅕ carapace width at that point. Carapace surface densely covered with large granules.

Mesosoma: All dorsal plates densely covered by large granules; segment 7

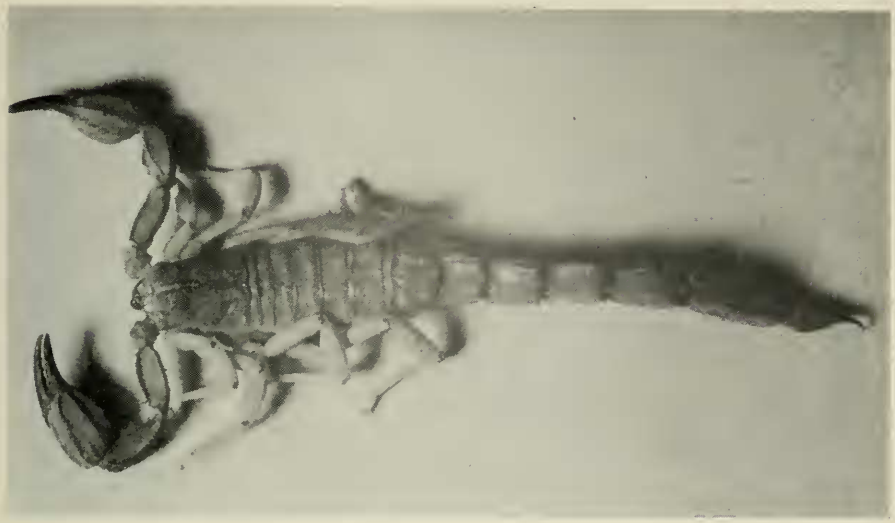

Figure 24. *Vejovis bruneus,* new species. Dorsal view of holotype.

with two pairs of lateral keels and one medial keel, these keels set with large dentate granules; each inner lateral keel terminates posteriorly with enlarged tooth. Sternites relatively smooth and lustrous; one pair of crenulate keels on sternite 7. Stigma long oval.

Metasoma: All dorsal and dorsolateral keels complete and with large granules giving serrate appearance, except that the dorsals absent on segment V; each dorsal keel terminates posteriorly in a slightly enlarged tooth. Lateral keels present and serrate on posterior 5/6 of segment I, posterior 1/6 of II and III, absent on IV, present and serrate on anterior 2/3 of V. Inferior lateral and inferior median keels distinct and finely serrate to crenulate on all segments. Inferior intercarinal space of segment V without noticeable granulation.

Telson: Ventral surface of vesicle smooth and lustrous, lacking granulation; this surface with a number of fine inconspicuous hairs; no subaculear tubercule.

Pectines: Long and thick; triangular fulcra; 18 pectinal teeth. Inferior surface with short, red hair, especially dense on fulcra, middle lamellae and anterior margin.

Genital operculum: Completely divided longitudinally; large distinct genital papillae visible externally.

Chelicerae: Inferior border of movable finger completely lacking denticles; terminal tooth of superior border of movable finger and terminal tooth of inferior border subequal.

Pedipalps: Palm of hand greatly swollen; all keels well developed and granular. Fixed and movable finger each distinctly shorter than carapace. In-

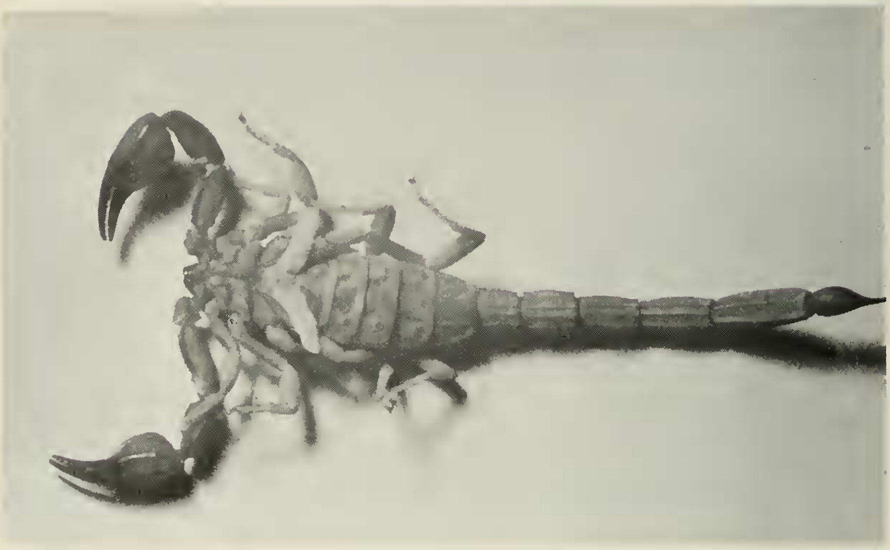

FIGURE 25. *Vejovis bruneus,* new species. Ventral view of holotype.

ternal margin of fingers not scalloped; no open gap exists when chela closed; fingers with teeth extending to proximal border.

Standard measurements and photographs: Table 9 and figures 24 and 25.

DESCRIPTION OF ALLOTYPE (female). Morphologically the same as holotype with the following exceptions: strikingly larger in all body dimensions; pectines with slightly fewer teeth (16 instead of 18); no genital papillae; genital operculum not completely divided longitudinally; ventral surface of vesicle appears more hirsute; aculeus proportionally longer.

Standard measurements: Table 9.

VARIATION WITHIN PARATYPES. Study of 173 paratopotypes (124 males, 49 females) indicated little significant variation from the description of holotype and allotype. Males varied in total length from 22 to 41 millimeters while females varied from 19 to 50 millimeters. Most specimens of both sexes appeared to be mature. Mature females appeared to attain larger body proportions than did mature males. Pectines varied from 15 to 17 (predominantly 16) in females and from 17 to 19 (predominantly 18) in males. Little sexual dimorphism occurred except for body size, smaller female pectines, females with fewer pectinal teeth, presence of genital papillae in males, and completely divided male genital operculum. Both sexes were very similar in color, structure and proportions. Young instars differed from adults in that they were more whitish in color, lacked reddish brown pigments on pedipalp fingers and had pedipalp palms not swollen.

Table 9. *Measurements (in millimeters) of* Vejovis bruneus, *new species, holotype and allotype.*

	Holotype (male)	Allotype (female)
Total length	38.3	51.2
Carapace, length	5.2	6.7
width (at median eyes)	3.6	4.6
Mesosoma, length	9.9	15.0
Metasoma, length	18.4	23.5
segment I (length/width)	2.6/2.7	3.2/3.2
segment II (length/width)	2.9/2.5	3.8/3.1
segment III (length/width)	3.0/2.4	4.0/2.9
segment IV (length/width)	4.2/2.2	5.2/2.7
segment V (length/width)	5.7/2.1	7.3/2.5
Telson, length	4.8	6.0
Vesicle (length/width)	3.0/1.6	3.3/2.0
depth	1.3	1.6
Aculeus, length	1.8	2.7
Pedipalp		
Humerus (length/width)	4.0/1.5	4.2/1.9
Brachium (length/width)	4.1/1.8	5.4/2.3
Chela (length/width)	7.4/2.8	10.3/3.4
depth	3.0	3.6
movable finger, length	4.1	5.8
fixed finger, length	3.0	4.4
Pectines		
teeth (left/right)	18/18	16/16

Type data and etymology. The holotype, allotype, and 173 paratopotypes were collected 5 miles southwest of San Miguel de Comondu, elevation 1000 feet, 2 July 1968 by S. C. Williams, M. A. Cazier, and party. The holotype and allotype are permanently deposited in the California Academy of Sciences.

This species is named "*bruneus*" because of its brownish coloration.

Material. In addition to the holotype, allotype, and 173 paratopotypes, 173 additional paratypes were studied. These were from the following locations in Baja California Sur, Mexico: 8 miles northwest of San Raymundo, elevation 500 feet, 30 June 1968 (S. C. Williams, M. A. Cazier, and party), 23 males, 3 females; 5 to 10 miles southwest of San Miguel de Comondu, elevation 1000 feet, 3 July 1968 (S. C. Williams, M. A. Cazier, and party), 117 males, 30 females.

Comment. This species was found only in the samples taken around Comondu and near San Raymundo. The habitats were predominantly rocky volcanics where some fine textured soil had accumulated (fig. 12). This species appears to be a burrower. Young instars and adult females were conspicuously rare in the samples. All specimens were collected by means of ultraviolet detection.

Vejovis insularis Williams, new species.

(Figures 26, 27.)

Diagnosis. Medium sized species of *Vejovis* with mature females attaining larger body size than mature males. Base color of body bright yellow, with pedipalp fingers dark reddish brown. Pedipalp hands with short fingers and swollen palms; movable finger distinctly shorter than carapace; keels well developed and granular on palm; neither sex with scalloped fingers or open space when chela closed. Chelicerae with inferior border of movable finger lacking denticles; inferior median and inferior lateral keels of metasoma well developed and finely serrate; telson with conspicuously reduced vesicle and conspicuously elongate aculeus; vesicle of both sexes densely covered with long conspicuous reddish hairs; pectines with 18 to 19 teeth in males and 16 to 17 teeth in females.

Closely related to *Vejovis punctipalpus* (Wood) from which it differs in the following characteristics: hirsuteness of telson; absence of scalloped pedipalp fingers on both sexes; absence of proximal space when chela closed.

Description of holotype (male). *Coloration*: Carapace, mesosoma, metasoma and pedipalps uniform bright yellow; walking legs similar to pedipalps but lighter; pectines white. Only contrasting color markings: eyes black, cheliceral teeth light brownish, pedipalp fingers light reddish brown, aculeus dark reddish brown, tips of pretarsal claws light brown. Cuticle otherwise unpigmented.

Carapace: Anterior margin with six red bristles and with subtle median emargination; lateral eyes three per group, most anterior eye in each group largest; median eye diad slightly greater than ⅕ carapace width at that point; carapace surface densely covered with large granules.

Mesosoma: All tergites densely covered by large granules; tergite 7 with two pairs of coarse granular lateral keels and a short granular median keel; inner lateral keels each terminate posteriorly in a slightly enlarged spine. Sternites agranular; one pair of keels on sternite 7, this crenulate to serrate; stigma short slits.

Metasoma: All dorsal and dorsolateral keels serrate except that dorsal keels of segment V absent, these keels on segments I to IV each terminate posteriorly as an enlarged spine; lateral keels serrate on posterior ⅚ of I, ⅙ of II and III, absent on IV, serrate to crenulate on anterior ½ of V; inferior median and inferior lateral keels all well developed and finely serrate. Inferior median keels each set with three or four pairs of reddish bristles on segments I to IV; inferior intercarinal space of segment V mostly smooth and not conspicuously granular. All dorsal intercarinal spaces granular.

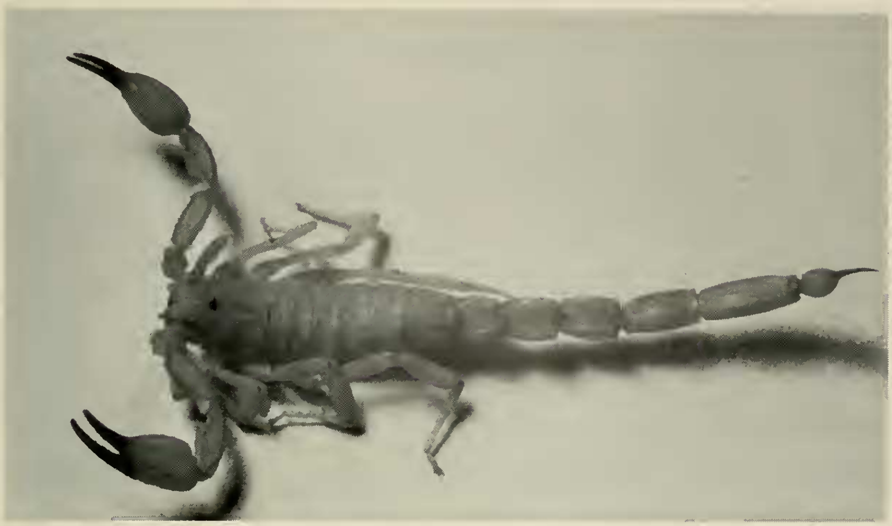

Figure 26. *Vejovis insularis,* new species. Dorsal view of holotype.

Telson: Ventral aspect of vesicle smooth and lustrous, lacking granulation; densely covered with long, conspicuous reddish hairs, each approximating aculeus in length; no subaculear tubercule; aculeus long and curved, about ⅔ length of vesicle.

Pectines: Long and broad; 18/17 pectinal teeth; with abundant reddish hairs, these most abundant on fulcra, middle lamellae, and anterior margin; fulcra triangular.

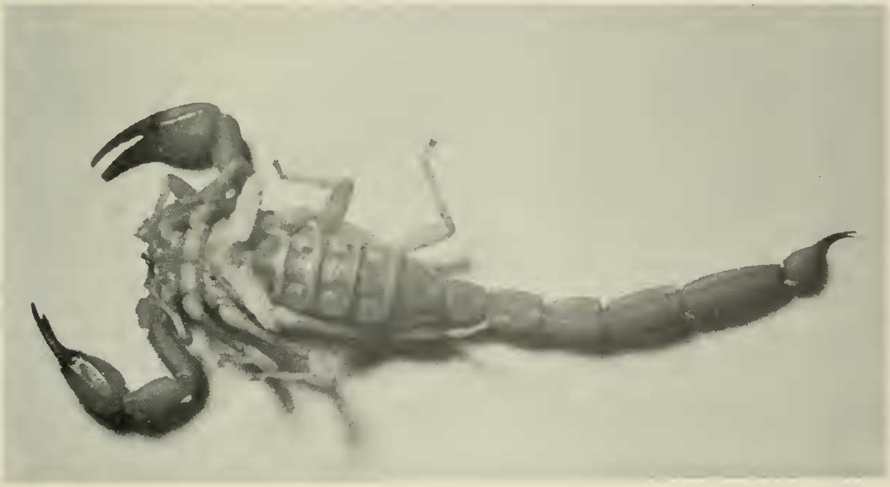

Figure 27. *Vejovis insularis,* new species. Ventral view of holotype.

Table 10. *Measurements (in millimeters) of* Vejovis insularis, *new species, holotype and allotype.*

	Holotype (male)	Allotype (female)
Total length	38.0	48.1
Carapace, length	5.0	6.3
width (at median eyes)	3.5	4.4
Mesosoma, length	10.0	14.2
Metasoma, length	18.2	21.7
segment I (length/width)	2.5/2.5	2.8/3.0
segment II (length/width)	3.0/2.4	3.6/2.8
segment III (length/width)	3.2/2.3	3.8/2.8
segment IV (length/width)	4.0/2.2	4.8/2.6
segment V (length/width)	5.5/2.0	6.7/2.4
Telson, length	4.8	5.9
Vesicle (length/width)	2.8/1.6	3.3/1.8
depth	1.2	1.4
Aculeus, length	2.0	2.6
Pedipalp		
Humerus (length/width)	3.8/1.3	5.1/1.7
Brachium (length/width)	4.0/1.7	5.2/2.2
Chela (length/width)	7.4/2.5	9.5/3.0
depth	2.7	3.4
movable finger, length	4.1	5.5
fixed finger, length	2.8	4.2
Pectines		
teeth (left/right)	18/17	17/17

Genital operculum: Completely divided longitudinally; distinct genital papillae visible externally.

Chelicerae: Inferior border of movable finger completely lacking denticles.

Pedipalps: Palms swollen; keels well developed and with low rounded granules. Fixed finger and movable finger each distinctly shorter than carapace; grasping edges of fingers not scalloped, no gaping space between fingers when chela closed.

Standard measurements and photographs: Table 10 and figures 26 and 27.

Description of allotype (female). Coloration and patterns essentially the same as holotype except allotype with more brownish base color and darker pedipalp fingers. Structure essentially the same as holotype except: body size much larger in all dimensions; lacks genital papillae; genital operculum not completely divided longitudinally.

Standard measurements: Table 10.

Variation within paratypes. Study of 3 paratopotypes (2 males, 1 female) indicated little variation from the description of holotype and allotype. Males were all about the same body size and varied in total length from 29 to 33 millimeters, while females also were about the same body size and varied from 44 to 48 millimeters. Pectine tooth counts varied from 16 to 17 (predominantly 16) in females and from 18 to 19 (predominantly 19) in males. The males were distinctly shorter in body length than the holotype and had hairs on vesicle somewhat shorter.

Type data and etymology. The holotype, allotype, and 3 paratopotypes were collected on Isla Partida, in the large central valley, Baja California Sur, Mexico, 10 July 1968 by S. C. Williams, M. Bentzien, and W. Fox. Isla Partida is the small separated island adjacent to the north end of Isla Espiritu Santo (several other islands are sometimes also referred to as "Partida"). The holotype and allotype are permanently deposited in the California Academy of Sciences.

This species is named "*insularis*" because it is known only from Isla Espiritu Santo and Isla Partida. It may occur on other Gulf islands but it appears not to occur on the peninsula of Baja California.

Material. In addition to the holotype, allotype, and 3 paratopotypes, 4 additional paratypes were studied. These came from the following localities in Baja California Sur, Mexico: Isla Espiritu Santo, north shore facing Isla Partida, 8 July 1968 (S. C. Williams, M. Bentzien, and W. Fox), 1 male, 1 female; Isla Partida, large central valley, 9 July 1968 (S. C. Williams, M. Bentzien, and W. Fox), 2 females.

Comment. This species is known only from Isla Partida and Isla Espiritu Santo in the southern end of the Gulf of California. The preferred habitat appeared to be places where rocky volcanic hillsides met open fine textured soils at their base (fig. 28). This species was not abundant on these islands judging by the samples and was not widely distributed among the available habitats. The specimens on Isla Espiritu Santo were very similar to those of Isla Partida. The two islands have apparently only recently become separated by a narrow channel of sea. The scorpion populations on the two islands are probably biologically isolated at this time, but this isolation has not been long enough for the population to diverge to a distinguishable degree. All specimens were collected by ultraviolet detection.

Vejovis gravicaudus Williams, new species.

(Figures 29, 30.)

Diagnosis. Medium to large species of *Vejovis* with mature females attaining larger and heavier bodies than mature males. Carapace and mesosomal dorsum brownish yellow with underlying dusky markings; two pairs of dark stripes underlying inferior keels of metasoma. Pedipalp with palm slightly swollen and with keels obsolete; palm agranular; movable finger shorter than

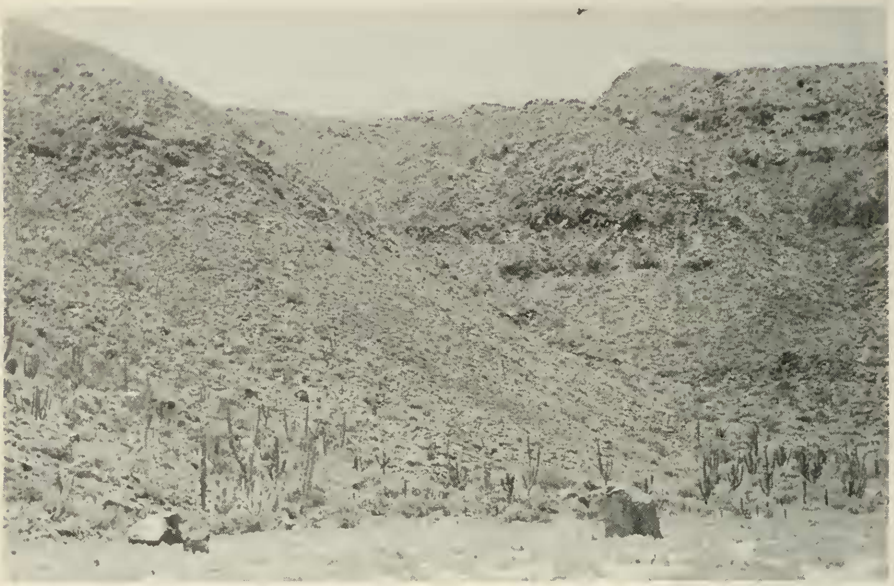

FIGURE 28. Type locality and habitat of *Vejovis insularis* on Isla Partida, Baja California Sur, Mexico, 9 July 1968.

carapace. Metasoma with inferior lateral keels greatly reduced and smooth; inferior median keels obsolete. Pectines with 19 to 23 teeth in females, 24 to 27 teeth in males. Inferior border of movable cheliceral finger lacking denticles; mature males with vesicle appearing bald while mature females have very hirsute vesicle.

Related to *Vejovis spinigerus* (Wood) but differs in the following characteristics: vesicle of mature female distinctly more hirsute than in *V. spinigerus*; mature male with vesicle distinctly less hirsute than in *V. spinigerus*; very definite sexual dimorphism exists in mature instars in regard to telson hirsuteness (this is not the case in *V. spinigerus*); greater proximal space exists between fingers when chela closed; dorsal stripes on mesosoma not distinct—even in young instars.

DESCRIPTION OF HOLOTYPE (male). *Coloration*: Carapace and mesosoma brownish yellow with underlying dusky markings; metasoma pale yellow with keels contrastingly reddish orange; pedipalps and walking legs pale yellow; pectines yellowish white. Contrasting color markings are: eyes black, teeth of chelicerae reddish brown, fingers of pedipalp light amber, vesicle reddish brown, aculeus dark red to black, position of inferior keels of metasoma outlined with dark pigment, tips of pretarsal claws light orange.

Carapace: Anterior margin straight with 7 erect bristles. Lateral eyes three

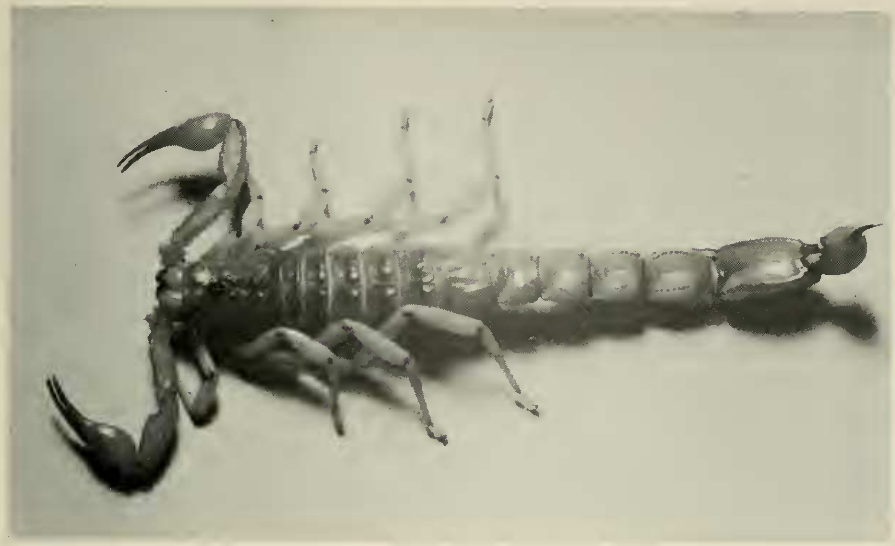

Figure 29. *Vejovis gravicaudus,* new species. Dorsal view of holotype.

per group, anterior two in each group largest. One large, erect bristle lateral to posterior margin of each median eye; diad slightly more than ⅕ carapace width at that point. Carapace surface covered with large granules.

Mesosoma: All dorsal plates covered with large granules, segment 7 with two pairs of lateral keels with large dentate granules; lateral margin of segment 7 abruptly flattened horizontally and with serrate granules. Sternites relatively smooth and lustrous; one pair of obsolete keels on last sternite. Stigma long oval.

Metasoma: Dorsal and dorsolateral keels strongly developed and irregularly serrate and end in enlarged terminal tooth (except for dorsolateral keel of segment IV which ends in broad wing) on segments IV, dorsal keels of V composed of broadly arranged granules. Lateral keels present and crenulate on posterior ⅚ of segment I, smooth to crenulate on posterior ⅓ of II, smooth on posterior ⅕ of III, absent on IV, and obsolete on V. Inferior lateral and inferior median keels obsolete on all segments. Position of inferior median keels marked with three pairs of short reddish hairs on each segment. Inferior lateral and median keels of segment V serrate.

Telson: Ventral side with numerous, short, brownish hairs. Vesicle basically smooth but with numerous punctate depressions, and small subtle subaculear tubercule.

Pectines: Long and thick; large subcircular to triangular fulcra; 25 pectinal teeth. Inferior surface with short, reddish hairs especially dense on fulcra, middle lamellae, and anterior margin.

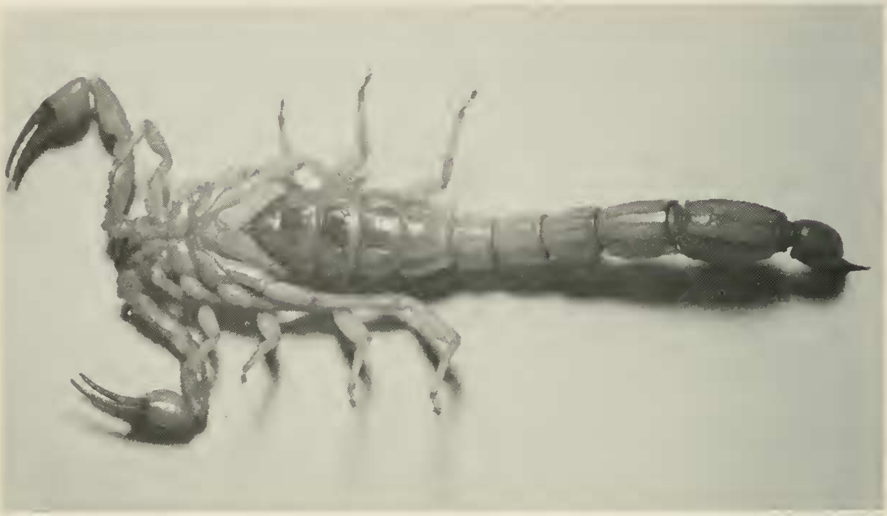

Figure 30. *Vejovis gravicaudus,* new species. Ventral view of holotype.

Genital operculum: Completely divided longitudinally; large genital papillae visible externally.

Chelicerae: Inferior border of movable finger completely lacking denticles; terminal tooth of superior border of movable finger subequal to terminal tooth of inferior border.

Pedipalps: Palm swollen, keels obsolete, entire palm smooth and lustrous. Fixed finger and movable finger each distinctly shorter than carapace. Internal margin of fingers not distinctly scalloped; teeth do not extend to proximal end of fingers. Proximal teeth do not meet in last scallop when chela closed.

Standard measurements and photographs: Table 11 and figures 29 and 30.

Description of allotype. Morphologically the same as holotype with the following exceptions: larger in all body dimensions; pectine with about 20 percent fewer teeth (21 instead of 25); carapace and tergites not as granular; carapace slightly lustrous; pectines smaller, no genital papillae, genital operculum not completely divided longitudinally; ventral side of vesicle densely covered with about 40 long reddish hairs.

Standard measurements: Table 11.

Variation within paratypes. Study of 27 paratopotypes (13 males, 14 females) indicated little variation from the description of holotype and allotype. Males varied in total length from 26 to 56 millimeters, while females varied from 43 to 64 millimeters. Most individuals of both sexes appeared to be mature, young instars were conspicuously absent. Mature females had a slightly wider and heavier mesosoma than mature males. Males and females similar in appearance with the following exceptions: female pectines smaller and with

TABLE 11. *Measurements (in millimeters) of* Vejovis gravicaudus, *new species, holotype and allotype.*

	Holotype (male)	Allotype (female)
Total length	59.7	65.1
Carapace, length	7.2	8.2
width (at median eyes)	5.2	6.3
Mesosoma, length	17.4	19.6
Metasoma, length	26.3	27.7
segment I (length/width)	3.7/4.6	3.7/5.1
segment II (length/width)	4.2/4.5	4.3/5.0
segment III (length/width)	4.4/4.5	4.5/5.0
segment IV (length/width)	5.8/4.6	6.1/5.3
segment V (length/width)	8.2/4.6	9.1/5.6
Telson, length	8.8	9.6
Vesicle (length/width)	5.8/3.7	6.6/4.6
depth	2.8	3.3
Aculeus, length	3.0	3.0
Pedipalp		
Humerus (length/width)	5.8/1.8	6.5/2.1
Brachium (length/width)	6.4/2.3	7.2/2.7
Chela (length/width)	9.7/3.0	11.4/2.7
depth	3.1	2.8
movable finger, length	6.5	7.0
fixed finger, length	4.8	5.4
Pectines		
teeth (left/right)	25/25	21/21

fewer teeth; males with genital papillae and with completely divided genital operculum; female vesicle hirsute, male vesicle bald in appearance. Pectine teeth varied in number from 19 to 23 (predominantly 20 and 21) in females and from 24 to 27 in males. There was a tendency for the dark stripes of the inferior metasomal keels to approach obsolescence on segments I and II. Smaller individuals had these stripes slightly darker than larger individuals. Largest individuals of each sex (presumably mature instars) had the telson with slight rose base color, smaller individuals had telson colored same as metasoma base color. There was some degree of individual variation in the expression of the underlying dusky pigmentation of the dorsum—some individuals with this obsolescent, others with it more prominent.

TYPE DATA AND ETYMOLOGY. The holotype, allotype, and 27 paratopotypes were collected 21.4 miles west of Los Aripes, elevation about 900 feet, 25 July 1968 by S. C. Williams, J. Bigelow, and M. Bentzien. The holotype and allotype are permanently deposited in the California Academy of Sciences.

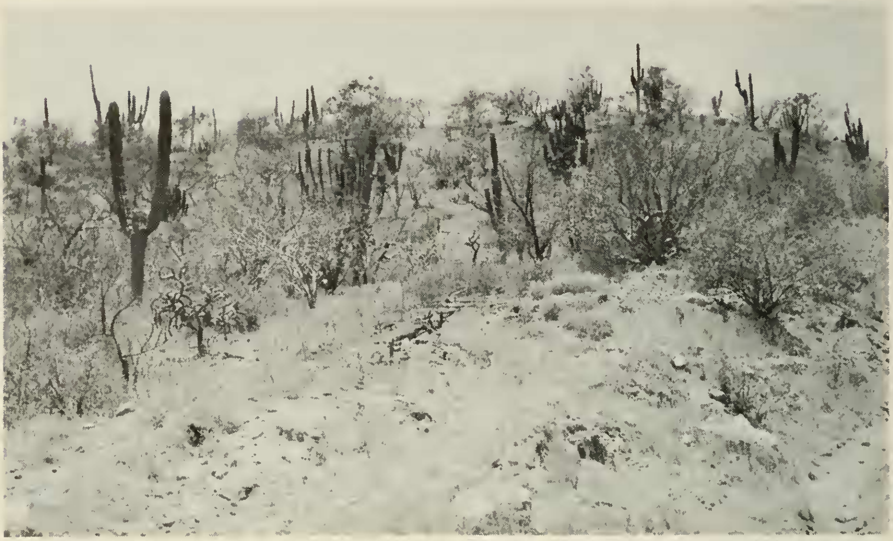

FIGURE 31. Type locality and habitat of *Vejovis gravicaudus,* 21.4 miles west of Los Aripes, Baja California Sur, Mexico, 26 July 1968.

This species is named "*gravicaudus*" because of its relatively robust metasoma.

MATERIAL. In addition to the holotype, allotype, and 27 paratopotypes, 170 additional specimens were studied. These came from the following locations in Baja California Sur, Mexico: 4 miles west of La Purisima on bank of Rio de La Purisima, elevation 375 feet, 1 July 1968 (S. C. Williams, M. A. Cazier, and party), 3 males, 3 females; 5 miles southwest of San Miguel de Comondu, elevation 1000 feet, 2 July 1968 (S. C. Williams, M. A. Cazier, and party), 37 males, 27 females; 5 to 10 miles southwest of San Miguel de Comondu, elevation 1000 feet, 3 July 1968 (S. C. Williams, M. A. Cazier, and party), 24 males, 24 females; 75 miles northwest of La Paz, elevation 200 feet, 4 July 1968 (S. C. Williams, M. A. Cazier, and party), 7 males, 8 females; 31 miles west of Los Aripes, elevation 800 feet, 25 July 1968 (S. C. Williams, M. Bentzien, and J. Bigelow), 6 males, 17 females; 35 miles northwest of Los Aripes, 27 July 1968 (S. C. Williams, M. Bentzien, and J. Bigelow), 2 males, 2 females; 15 miles northwest of Los Aripes, 27 July 1968 (S. C. Williams, M. Bentzien, and J. Bigelow), 5 males, 5 females.

COMMENT. This species was collected in the southern half of the peninsula in rocky, volcanic habitats (fig. 31). It was found only in inland areas, and was conspicuously absent in similar habitats near the coast. This species was most abundant in samples taken in the bottom of canyons and washes where outcrops of volcanic rock and moderately packed soils were adjacent to each other. All specimens were collected by means of ultraviolet detection.

Discussion and Conclusions

The 11 new species described here double the known species of *Vejovis* from Baja California, Mexico. It is very likely that most of these new species will prove to be endemic to this peninsula. Several of the new species have close relatives in California, Arizona, or mainland Mexico but several are so different that no close relatives have been found yet. It is interesting that some species, most notably *Vejovis pumilis,* were found to inhabit only soils in a region of very recent geologic origin. This would indicate that at least some species of scorpions may be genetically plastic and ecologically quite adaptable. The species belonging to the genus *Vejovis* appear to be uncommonly diverse in Baja California and also very abundant.

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